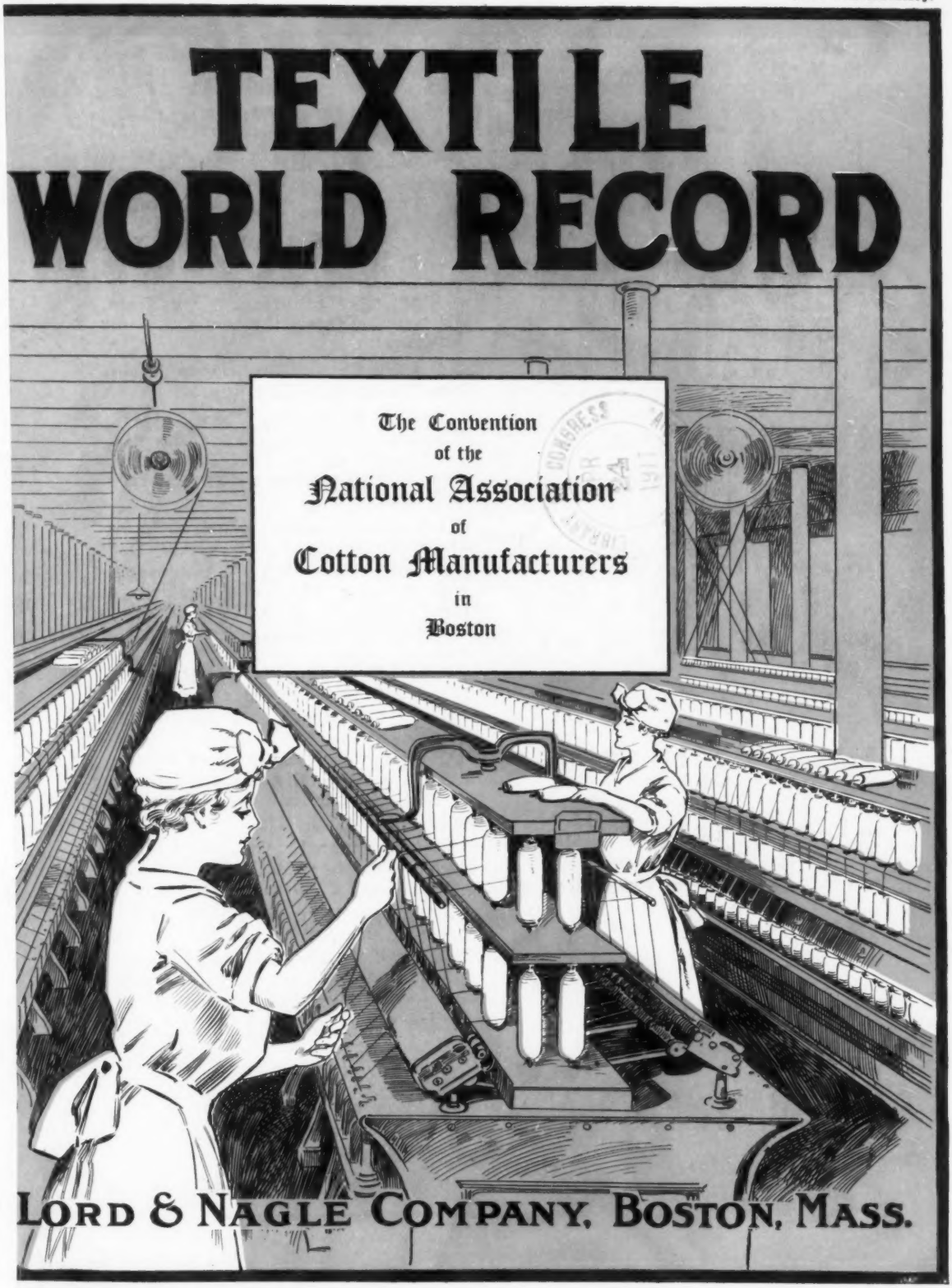
APR 21 1911

ıme XLI.
ıer 1.

APRIL, 1911.

$2.00 per year.
$3.00 with Directory.

TEXTILE WORLD RECORD



le of Contents, Page 65. Buyers Index, Page 203. Index to Advertisements, Page 213.

Mercerizing Machinery for Piece Goods

—— AND ——

Yarns in the Warp or Chain

All Kinds of Outfits for Bleaching Thread and Soft Twisted Yarns.
Bleaching Machinery for Yarns in the Warp or Chain.

BLEACHING
DYEING
DRYING
AND
FINISHING
MACHINERY

Singeing Machines, Boiling Kiers, Washers Water, Chemic and Sour Squeezers.

Rusden Patent, Continuous Chainless Steamer, Aniline Agers.

Dyeing Machines, Open Soapers, Blanket Washers, Color Kettles, Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders.

Water and Starch Mangles, Automatic Tentering Machines, Dyeing Machines for Chain Warps.

Dampening Machines. Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Sole Manufacturers of Patented Flexible Cloth Expander for Cylinder Drying Machines, Calenders, Mangles, etc.

Combination Rolls made of Cotton and Husk, especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-Deposited Copper Rolls for all purposes.

Padding and Drying Machines for Shade Cloths, Single and Double Cylinder Engines, Hydraulic Presses and Pumps.

Estimates, Drawings and full particulars of complete plants furnished on application

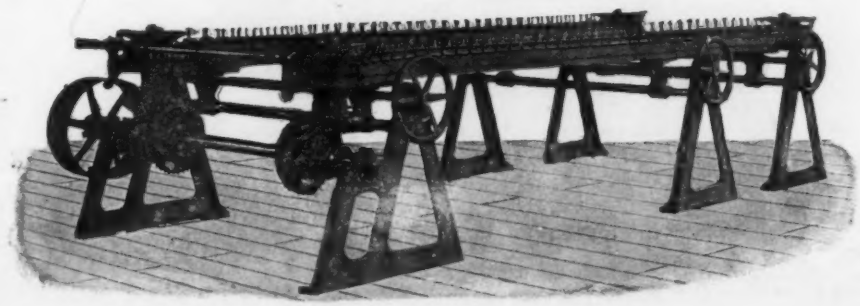
THE TEXTILE-FINISHING MACHINERY CO.

Howard Building, Providence, R. I.

17

435
3-1.21

49



STRAIGHT AUTOMATIC TENTERING MACHINE

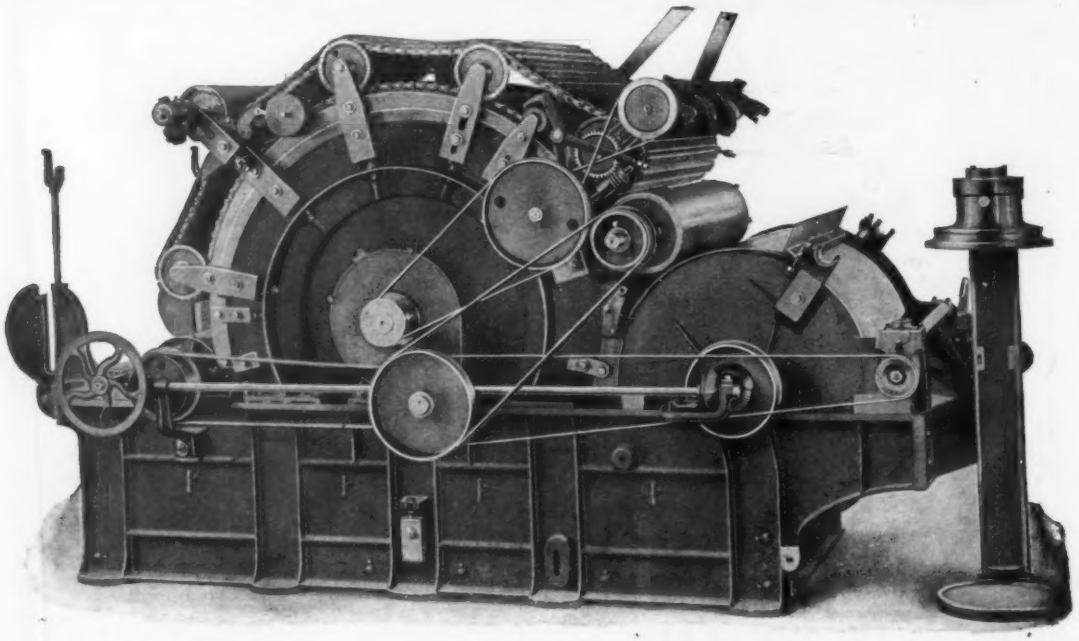
Dyeing, Bleaching, Drying and Finishing Machinery

for all textile fabrics.

H. W. BUTTERWORTH & SONS CO.

PHILADELPHIA, PA.

Providence Office, Room 417 Industrial Trust Building.



Cotton and Worsted Machinery

With Modifications to Suit Any Class of Work.

Cotton Machinery: Cards, Railway Heads, Drawing Frames, Fly Frames, Speeders, Ring Spinning Frames, Twisters, Spoolers, Reels, Warpers, Slashers, Winders, Looms, Shearing Machines, Balling Machines, Folders, Stamping Machines, Sewing Machines, Size Pumps, Size Kettles, Drawing-in Frames, Baling Presses, Indigo Grinders.

Worsted Machinery: Spinning Frames with caps, rings or flyers, Dandy Rovers and Reducers, Cone Second Finishers, Reducers and Rovers, Gill Boxes for Drawing, Preparing and Finishing, Weigh Boxes and Drawing Boxes, Cap Trap, Flyer and Ring Twisters.

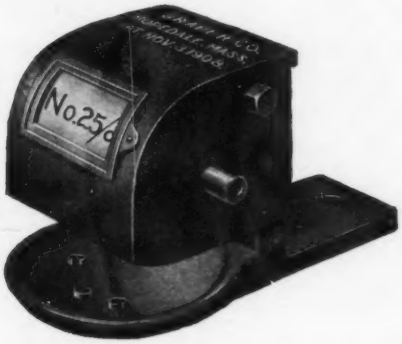
Plans, Specifications and Estimates furnished upon application.

Lowell Machine Shop

LOWELL, MASS.

If your fingers are all thumbs,

why try to sort your travelers by hand?



Let Duckworth's Traveler Magazine do the work.

OVER 5,000 IN SUCCESSFUL USE

DRAPER COMPANY

HOPEDALE, MASS.

J. D. CLOUDMAN, Southern Agent

40 SOUTH FORSYTH STREET ATLANTA, GEORGIA

THE EMPHATIC SUCCESS OF OUR "IDEAL" AUTOMATIC LOOM IS DUE TO SEVERAL SALIENT POINTS OF SUPERIORITY OVER ALL COMPETITORS:

1st. The ease and smoothness with which they start up.

2d. The acknowledged superiority of the cloth woven.

3d. Simple and thoroughly mechanical construction, assuring freedom from the constant breakage and expensive repairs attending other automatic looms.

4th. No special bobbins, shuttles or other expensive parts.

5th. Ability to use cop or bobbin filling interchangeably.

6th. Superiority of warp stop motion which does not break or fray the softest yarn.

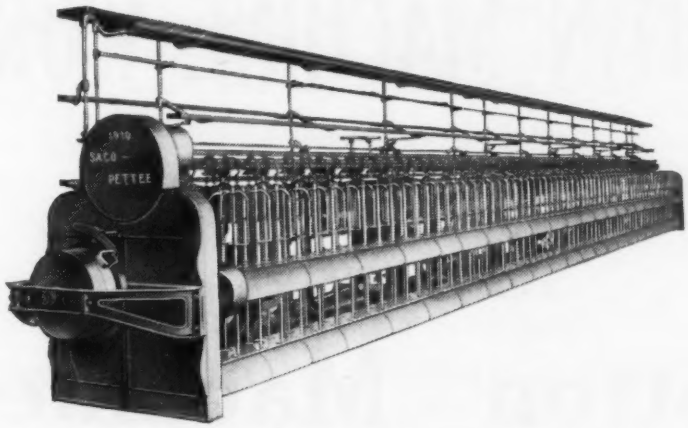
7th. Of the thousands in operation not a single bobbin or crank shaft broken.

IN PROOF OF CLAIMS WE POINT TO THOSE MILLS FORMERLY USING OUR COMPETITORS' LOOMS THAT ARE NOW USING OURS.

The Stafford Company

Readville, Mass.

Saco-Pettee



New Improved Roving Frame

A Rigid, Light Running, Easily Cared For Machine, producing Superior Roving at Lowest Cost for labor.

Catalogue upon application.

Saco-Pettee Company

Shops: Newton Upper Falls, Mass., Biddeford, Me.

Southern Agent, A. H. WASHBURN, Charlotte, N. C.

The

WHITIN MACHINE WORKS

Whitinsville, Mass.

BUILDERS OF

Cotton Machinery

CARDS	SPOOLERS
COMBERS	TWISTERS
DRAWING FRAMES	REELS
ROVING FRAMES	Long Chain Quillers
SPINNING FRAMES	LOOMS

Southern Agent:
STUART W. CRAMER,
Charlotte, N. C.

"KITSON"

Means Guaranteed Machinery

No installation left by us until running satisfactorily.

PLANS FURNISHED WITHOUT CHARGE.

OUR STANDARD PRODUCTS:

Bale Breaking Feeders
With Patented Mixing Feed Table.

Blowing Systems of all Descriptions
Our specialty in this line is the EXHAUST SYSTEM wherein no stock passes through fans.

Morton Automatic Distributor
Supplies Opener Feeders Automatically.
Also adapted to feeding Bins.

Condenser System
For small mills not requiring Distributor.

Self Feeding Openers **Lappers**
Waste Openers **Waste Cleaners**
Cleaning Trunk **Raw Stock Dryers**

Repair Parts for machines formerly built by
Whitehead & Atherton, Lowell, Mass.
Atherton Machine Co., Lowell, Mass.
A. T. Atherton Machine Co., Pawtucket, R. I.

Write for Catalog.

KITSON MACHINE SHOP, Lowell, Mass.

Burt Ventilators for Textile Mills

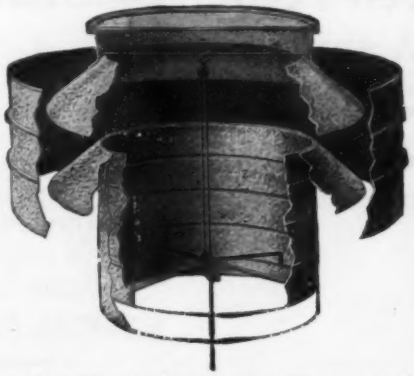
Read what one large concern has to say regarding the "Burt" installation:

BURT MFG. CO., Akron, Ohio. DANIELSON, CONN., Nov. 15th, 1909.

GENTLEMEN:—Yours of the 13th inst., duly received and in reply would say, thus far the 34-30" Burt Double Damper Ventilators installed by you on our weave shed have given excellent results, and we can honestly say that we made no mistake by installing your ventilators. Yours very truly,

(Signed) G. A. JOHNSTONE, Agent. DANIELSON COTTON MILLS.

Our Double Damper Ventilator is guaranteed to overcome all objections made to ventilators when used on weave sheds. Send for list of recent contracts of Burt's for use on weave sheds. We also manufacture regular ventilators for use on all kinds of buildings. During the last few months we have equipped 76 textile mills.



Notice patented sliding sleeve damper. Furnished with flat wired glass up to and including 72 inch size. Also made with metal tops.

Send for our new 112 page catalogue.

The Burt Mfg. Co.

432 Main Street
AKRON, OHIO

Largest Manufacturers of Oil Filters and Exhaust Heads in the World.

A Few Hard Facts

—and—

Some Comparisons

The Carrier System humidifies under all weather conditions, it cools in summer with the windows closed and heats in winter, without the aid of a separate heating system, to any definite temperature. You will find no other system that guarantees to accomplish this. Compare this with systems that partially cool in summer, the temperature rises, windows are open and the humidity falls. You are then confronted with the serious difficulty of draughts so disastrous to fine yarn.

In the Carrier System the humidity and temperature are controlled automatically; it is guaranteed to maintain within four (4) per cent of the humidity desired. The control is simple and accurate. Compare this with systems that must be controlled by hand or that are too delicate for ordinary mill use. They are expensive in up-keep and give an uneven condition of humidity that often varies to the extent of 50%.

In the Carrier System the humidity in the entire room is uniform. Compare this with systems that humidify only in "spots."

In the Carrier System there is no free moisture, compare this with a room full of free moisture that will rust your valuable machinery.

Carrier Air Conditioning Co.

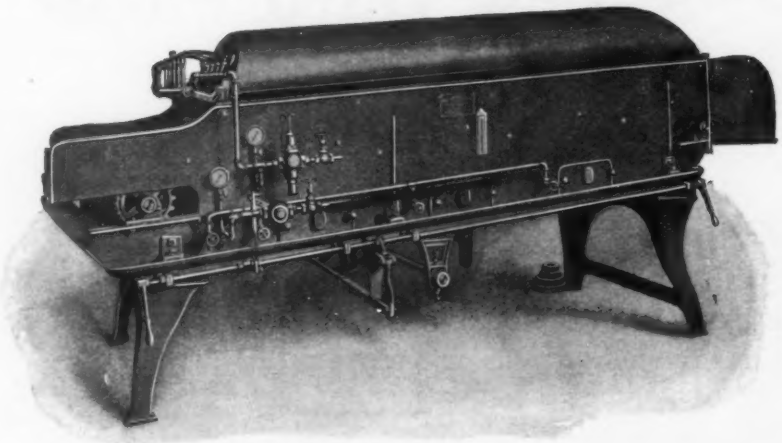
OF AMERICA.

39 Cortlandt Street - New York

(172-O)

OF AMERICA

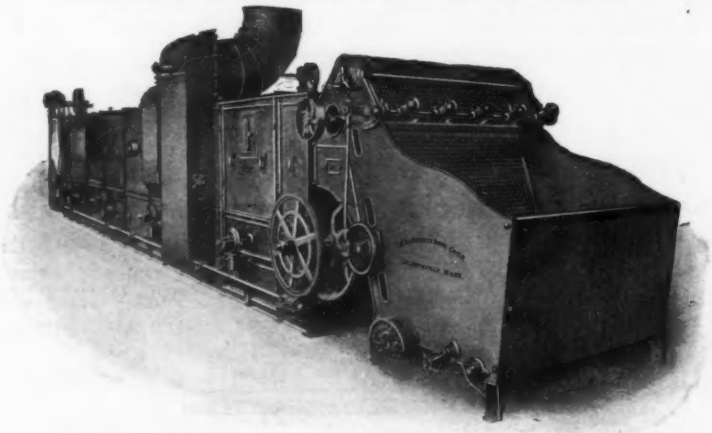
Yarn Conditioning Machine.



A Machine that Produces Results
An essential part of a modern mill equipment for uniformly conditioning yarns, without injury to bobbins
Absolutely controls the amount of moisture introduced into yarn

Sargent Drying Machines (fire resisting.)

Iron and Steel Construction, Asbestos Insulated.



For Cotton, Wool, Hair
Wool Washers, Wool Dusters and Openers
Carbonizing Dryers, Carbonizing Plants complete
Burr Pickers, Automatic Feeds for Cotton and Wool

C. G. SARGENT'S SONS, Corporation

GRANITEVILLE, MASS.

LEIGH & BUTLER

SUCCESSORS TO
EVAN ARTHUR LEIGH
232 Summer Street (opposite the South Station), Boston, Mass.

SOLE AGENTS

IN THE UNITED STATES AND CANADA FOR

Platt Bros. & Co., Ltd.

BY FAR THE LARGEST MAKERS IN THE WORLD OF

Cotton, Woolen and Worsted Machinery

Platt's Patent Opening and Picking Machinery.
Platt's Cotton Comber will comb from 7-8" stock to Sea Islands.
Platt's Special Machinery for Making Cotton Waste Into Yarns.
Platt's Special Machinery for Making French Worsted Yarns.
Platt's Woolen and Worsted Carding Engines, Special Designs.
Platt's Cotton, Cotton Waste, Woolen and Worsted Mules.

MATHER & PLATT, LTD.

Dyeing and Finishing Machinery.
Archbutt-Deeley System for purifying and softening water.

THE PATENT AUTOMATIC FEEDING MACH. CO., LTD.

Patent Feeding Machines for wool, cotton, flax, fur and fibrous material

JOSEPH SYKES BROS.
Card Clothing for Cotton.

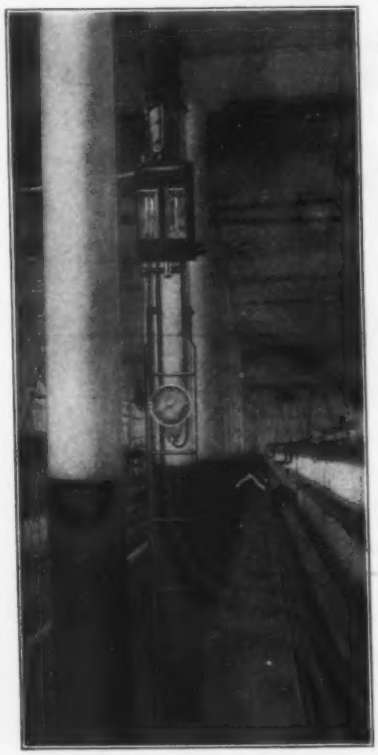
JAMES CRITCHLEY & SONS,
Card Clothing for Woolen and Worsted

WILSON BROS. BOBBIN CO.'S

Bobbins, Shuttles, etc.

Dronsfield Bros. Grinding Machinery and Emery Filleting. The Best French and English Combing and Rubbing Aprons. Harding's Pins and Circles. Varey's Fallers, etc.

AIR CONDITIONERS IN SPINNING ROOM.



AUTOMATIC REGULATOR MOUNTED ON COLUMN IN SPINNING ROOM.

Imitation is the Sincerest Form of Flattery, But—

Manufacturers are hereby warned against using infringements upon the Cramer patents for

Automatic Regulators

for Humidifying and Heating Systems and

Air Conditioners

of the Spray Type with Fans!

Before considering the purchase of infringing devices, make sure that the vendor is amply financially responsible and guarantees to indemnify the purchaser against loss by damage suits, for both infringers and users of infringments, however crude such infringments may be, will be prosecuted to the full extent of the law.

Don't be imposed upon by misleading terms and claims as to what the vendor's patents cover; anyone can get a patent for almost anything in the way of specific constructions; the vital question is whether or not such patents infringe other prior patents.

Cramer System of Air Conditioning

Vital Requirements for an Automatic Regulator:

(1) There must be *no wicking* on the wet bulb member *"to bother with and give trouble, and cause inaccurate indications."*

(2) Both the dry and the wet bulb members *must indicate actual temperatures that can be read*, that the alleged accuracy of the device may be checked up by the purchaser at all times.

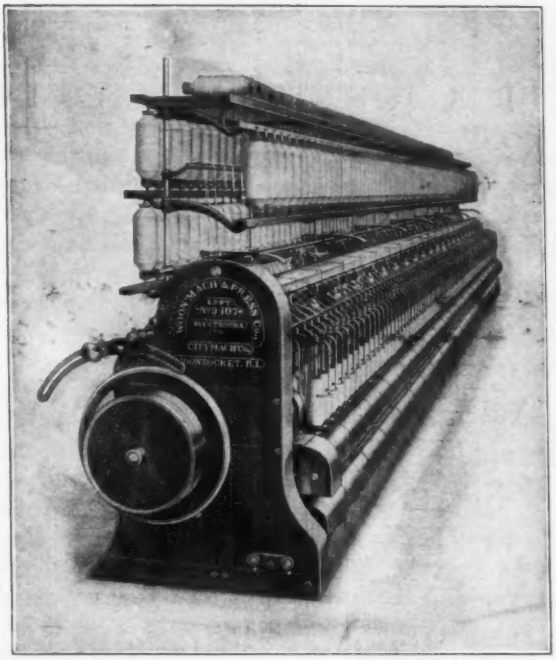
(3) The materials of which the dry and wet bulb members are made must *be well known to be durable*, and permanent under the trying conditions of moisture and temperature changes.

STUART W. CRAMER

Charlotte, N. C.

Providence, R. I. **Atlanta, Ga.**

ROVING MACHINERY
OUR SPECIALTY



OVER 1,000,000
BALL BEARING TOP ROLLS
IN USE

Woonsocket
Machine and Press Company
WOONSOCKET, R. I.

Southern Agent: J. H. MAYES, 1112 Realty Bldg., Charlotte, N. C.

POTTER & JOHNSTON MACHINE CO.

PAWTUCKET, R. I., U. S. A.

SOUTHERN REPRESENTATIVE:

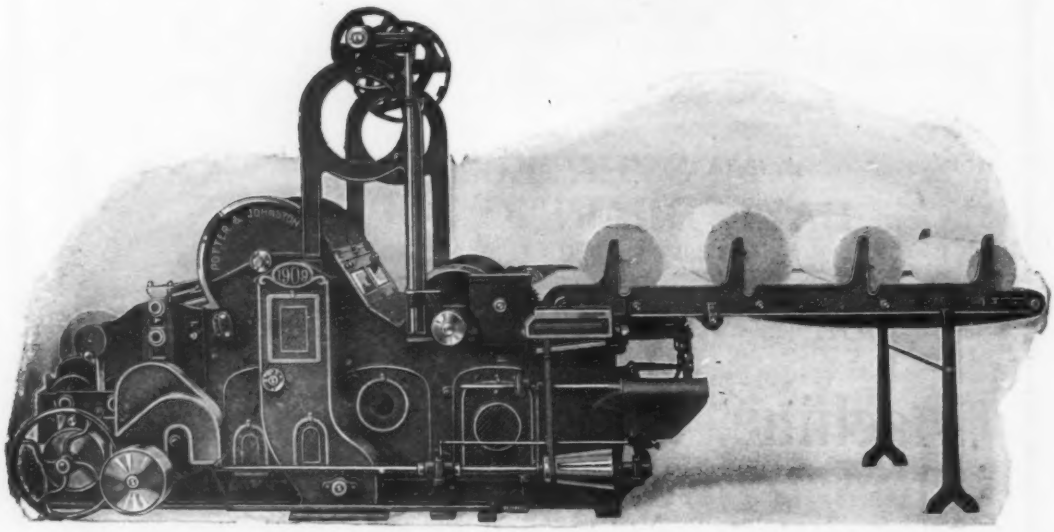
J. H. MAYES,

CHARLOTTE, N. C.

NORTHERN REPRESENTATIVE:

WM. MUIR,

PROVIDENCE, R. I.



SINGLE BEATER FINISHER.

Picking Machinery

MADE BY THE

POTTER & JOHNSTON MACHINE CO.,

has many new and valuable improvements, the workmanship and materials used are of the same high class as have characterized our products for many years.

Our textile machinery is made by the same tools and processes and with the same care and precision as enters into our machine tool work. The Beater and fan shafts are ground, all studs are case hardened and ground. High speed gearing is all cut, and fast running pinions are made of steel, cut, and case hardened. All medium and high speed bearings are ring oiling, the beater and fan bearings having been designed to overcome the trouble of oil leakage, which every carder knows has caused him serious annoyance by getting inside of the machine and onto the cotton, to say nothing of the cost of the oil. These bearings are oil-tight and neither allow oil to be drawn inside of machine or to leak outside.

The evener mechanism is so constructed that friction has almost been eliminated, and as a result, the slightest changes in thickness of laps will cause the necessary movement of the evener belt. This, of course, ensures an evenness of finished lap heretofore considered impossible.

Combined with the countershaft shipper handle is a locking device for the beater bonnet. This device locks the bonnet on starting, or if the bonnet is open the shipper is locked so that the machine cannot be started.

Improved forms of grid bars are used, the angle bars having milled knife edges, true and parallel to the edge of beater blade. The flat dust bars are made of sheet steel, and owing to their thinness are able to use over double the usual number and still keep the same space between bars and thus obtaining better cleaning action.

Between the cage stripping rolls and the lap head we have applied our patented Anti-Split rolls, which prevent split laps. There are two of these rolls, the lower one is composed of a series of steel disks on a shaft, which run in corresponding grooves in the upper roll, the cotton passing between them is corrugated lengthwise with small ribs which are pressed down by the calendar rolls into reinforced strips binding the sheet together.

The brake motion for the lap racks is adjusted by set screws for any desired friction, and change in same can be very quickly accomplished.

Everything about the machine is substantial, and in all its refinements none have been attained by a sacrifice of strength or ample wearing surface. We guarantee this picker to do better cleaning and evening with less cost for power, oil, and repair than any other machine on the market. The quality of the workmanship throughout is well illustrated by the fact that when running either idle or operating on cotton one can hardly tell from the sense of hearing that gears have any place in its construction, and the general appearance of the machine is such as to commend it to all who like nice lines and high finish in the machinery of their mills.

We have finished machines at our works that are at all times open for inspection, as well as our shop and manufacturing processes.

WHY IS
The Turbo-Humidifier
((The Humidifier with the Guarantee)

?

With some few humidifiers in the field, why did the inventor of the Turbo spend time and energy and burn "midnight oil" trying to make another?

The answer is the old story, "invention is the child of necessity and the legitimate offspring of experience and dissatisfaction."

The inventor of the Turbo had had experience with every humidifier then existing—had used them all. Less than three years ago he set out to make a humidifier that would meet the fundamental requirements of a cotton mill, one that would be simple, economical in first cost and in cost of maintenance;—and efficient.

And the result?

The Turbo-Humidifier, (with the guarantee) which has met with continued success from the very start, the primary secret of its success being that it completely vaporizes all the water used.

The Turbo-Humidifier can be used in the lowest posted rooms, is free from drain pipes, casings, cloths, mantels, moving parts and other "contraptions."

With it you can easily vary the degree of humidity direction, quantity and fineness of the spray. It cannot overflow, but if you have a grouch on regarding humidifiers—well, you haven't seen the Turbo, that's all.

Send for the catalog—it proves that if you want a humidifier you want the Turbo.

The G. M. Parks Company

Fitchburg, Mass.

Southern Office, No. 1 Trust Bldg., Charlotte, N. C.

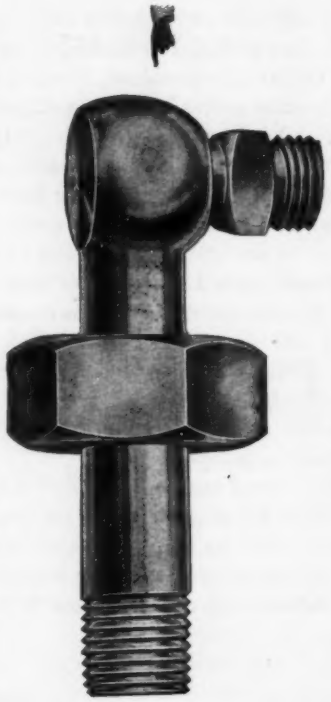
B. S. Cottrell, Mgr.

Simplicity

Complete Vaporization

Air Cleaning

No Second-Hand Water

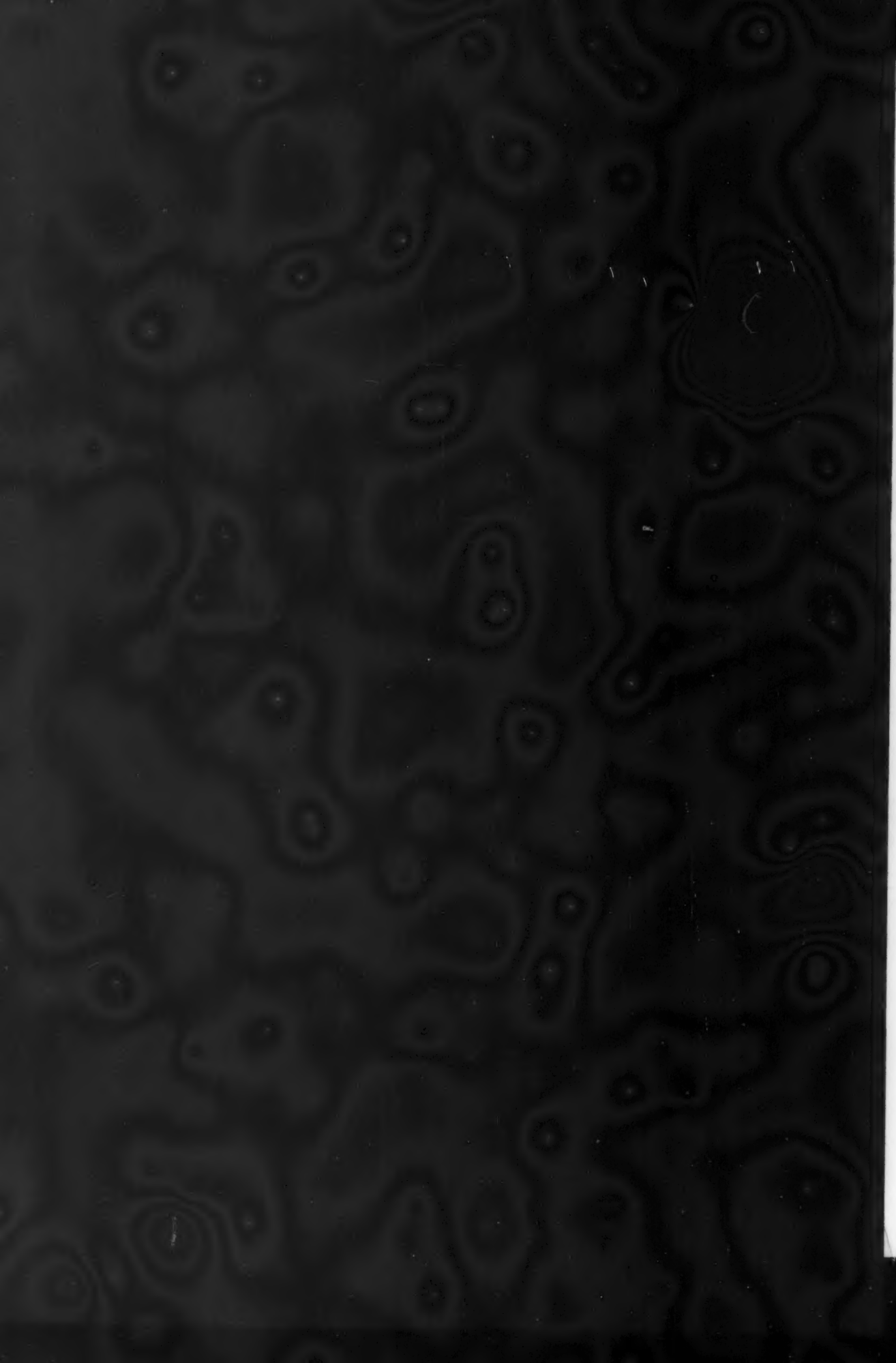


No Moving Parts

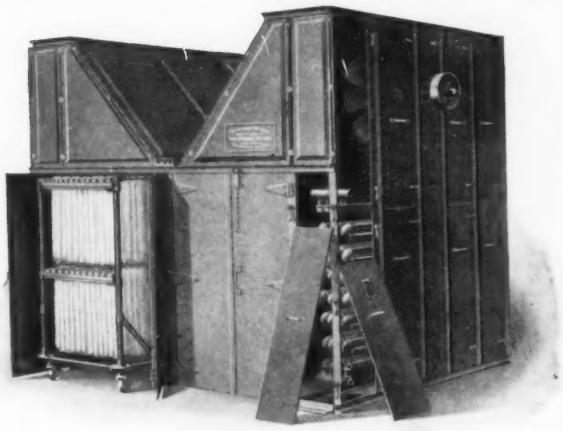
No Casings

No Drains

TURBO TRADE MARK HUMIDIFIER



FIRE-PROOF



Truck Yarn Dryer.

"HURRICANE"

DRYERS

(Steel Construction with Asbestos Insulation)

Built in many sizes and types for

YARN, KNIT GOODS,
RAW STOCK, CLOTH, Etc.

Write for Catalogs

"HURRICANE"

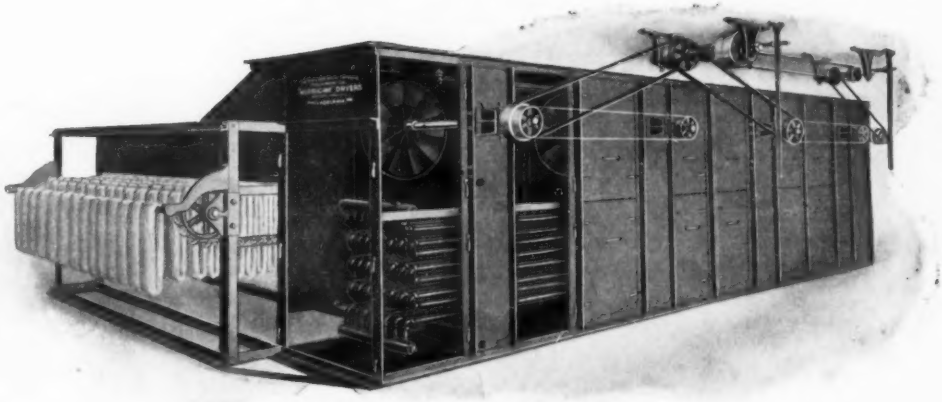
DYEING MACHINES

Do Better Work with
Less Labor, Steam and Chemicals

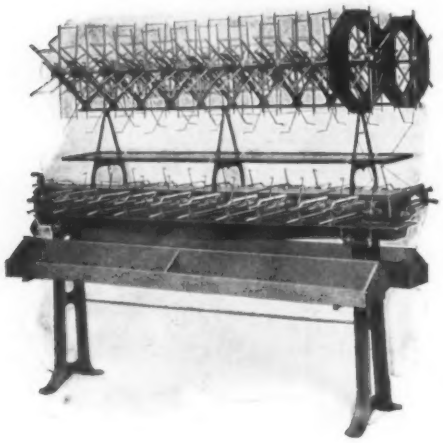
THE PHILADELPHIA DRYING MACHINERY CO.

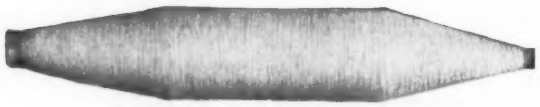
Complete Equipments for Scouring, Bleaching, Carbonizing, Singeing, Etc.

6721 Germantown Avenue, - - - Philadelphia, Pa.



Automatic System of Drying Yarn, Slubbing, etc.

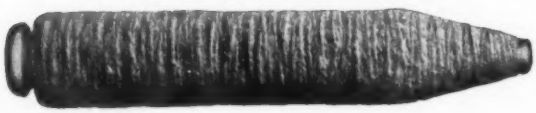


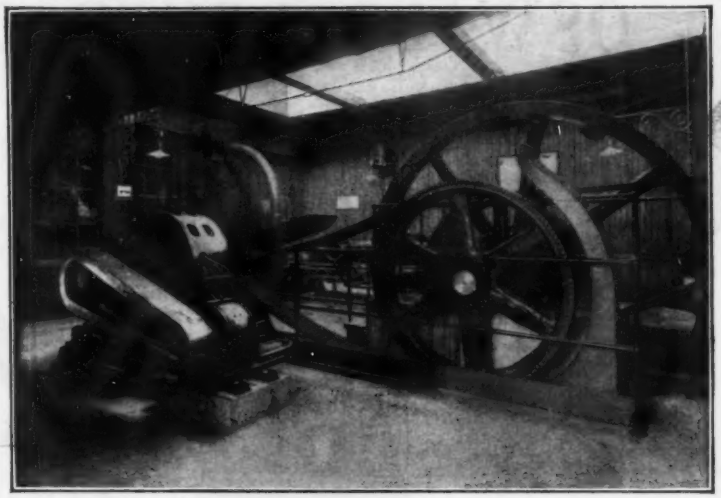


"UNIVERSAL FILLING"

Reduces the cost of weaving and improves the fabric

Universal Winding Co., Boston





We have in the past months shown you a few of the

SPECIAL APPLICATIONS OF MORSE FLEXIBLE GEARING IN TEXTILE MILL SERVICE

Such as Spinning Frame Drives and Line Shaft Drives

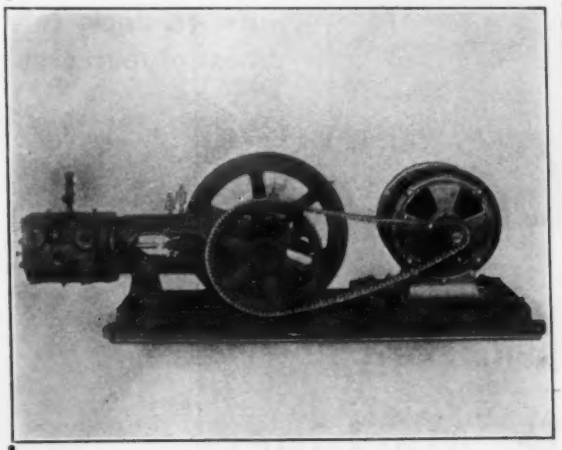
BUT DO NOT

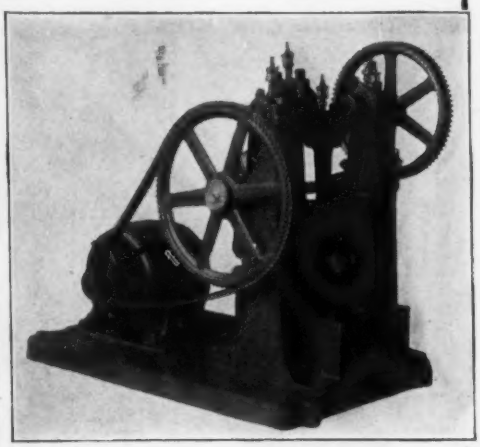
lose sight of the fact that the range of application of this form of power transmission is practically **unlimited.** In many cases **Morse Chains** will give **Better Service** than any other form of drive for running **Pumps, Compressors, Electric Generators, Exciters, Fans, Etc.**

We now have in successful operation drives transmitting an aggregate of over 500,000 H. P. Individual drives running from 1 H. P. to 2000 H. P. each.

Let us figure on some of your power transmission problems.

Our Bulletin No. 9B is particularly interesting.





MORSE CHAIN CO., Ithaca, N. Y.

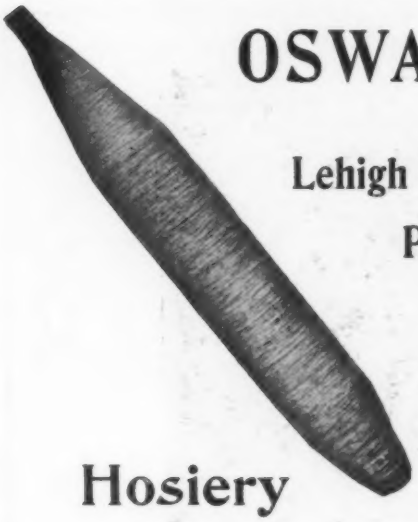
N. E. BRANCH, 141 MILK STREET, BOSTON

OSWALD LEVER CO.

(INCORPORATED)

Lehigh Avenue and Hope Street

PHILADELPHIA, PA.

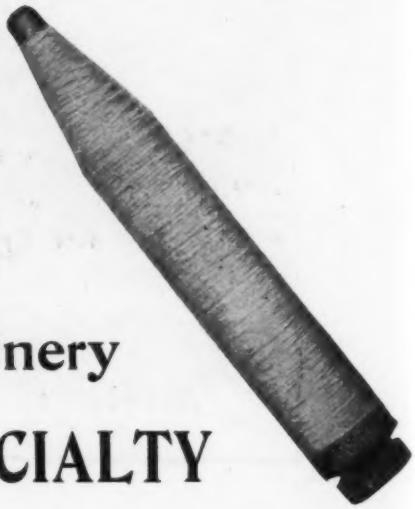


Hosiery Winders

To wind from the skein to the knitting bobbin in all sizes to suit any kind of yarn.

Cross Traverse Quillers

To wind direct from the skein or twister spool onto cops, butts, wood quills or paper tubes, to suit any grade of yarn from the coarsest of jute or duck to the finest of mercerized.



BUILDERS OF

Textile Machinery

WINDING A SPECIALTY

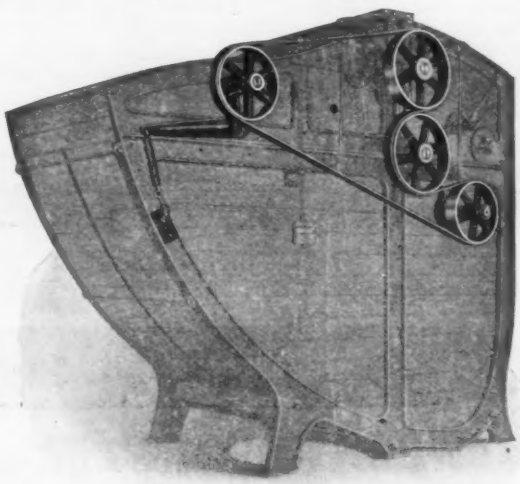
JAMES HUNTER MACHINE CO.

NORTH ADAMS, MASS., U. S. A.

Fulling Mill *Bulletin 50 A*

The Hunter

FULLING MILL
WITH
SILENT BELT DRIVE



SUPERIOR TO THE ROPE OR GEAR DRIVE
"BUILT BY HUNTER"

Ask for Bulletin 50-A

American Textile Specialty Machinery Co.

670 Eddy St., Providence, R. I.

MANUFACTURERS OF

SHUTTLES AND SHUTTLE IRONS

FOR ALL TEXTILE PURPOSES

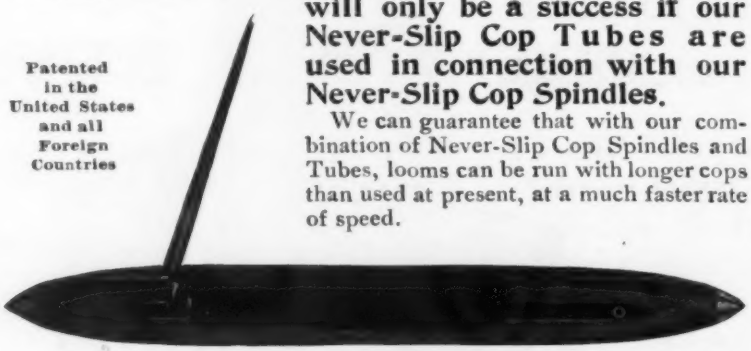
Never-Slip Cop Tube

Patent applied for

Filling-Waste is reduced to nothing and long Cops will only be a success if our Never-Slip Cop Tubes are used in connection with our Never-Slip Cop Spindles.

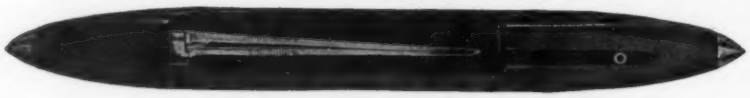
We can guarantee that with our combination of Never-Slip Cop Spindles and Tubes, looms can be run with longer cops than used at present, at a much faster rate of speed.

Patented in the United States and all Foreign Countries



Shuttle with Spindle Raised

U. S. Patents: 778851, Jan. 3, 1905; 790611, May 23, 1905; other patents pending



Shuttle with Spindle Lowered

U. S. Patents: 778851, Jan. 3, 1905; 790611, May 23, 1905; other patents pending

We also manufacture a complete line of

Paper Cop Tubes, Cones and Shells

Send your samples and we will quote prices on any lot desired.

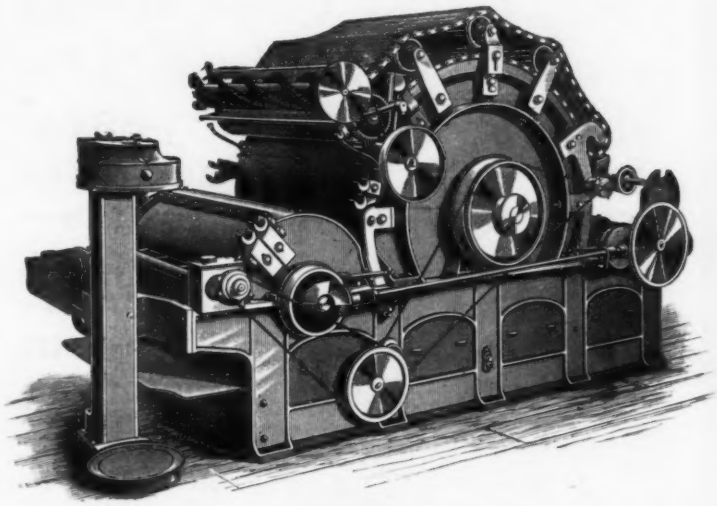
New York Office, 363-373 Rider Ave.

Cotton Machinery

MASON MACHINE WORKS,

TAUNTON, MASS.

Southern Office,
Charlotte,
N. C.



Cards,
Combers, Railway
Heads, Drawing Frames
Spinning Frames, Mules and Looms

INCLUDING

Plain and Fancy Silk Looms

Starch

A Prominent New England Mill had been sizing warps with potato starch for 25 years.

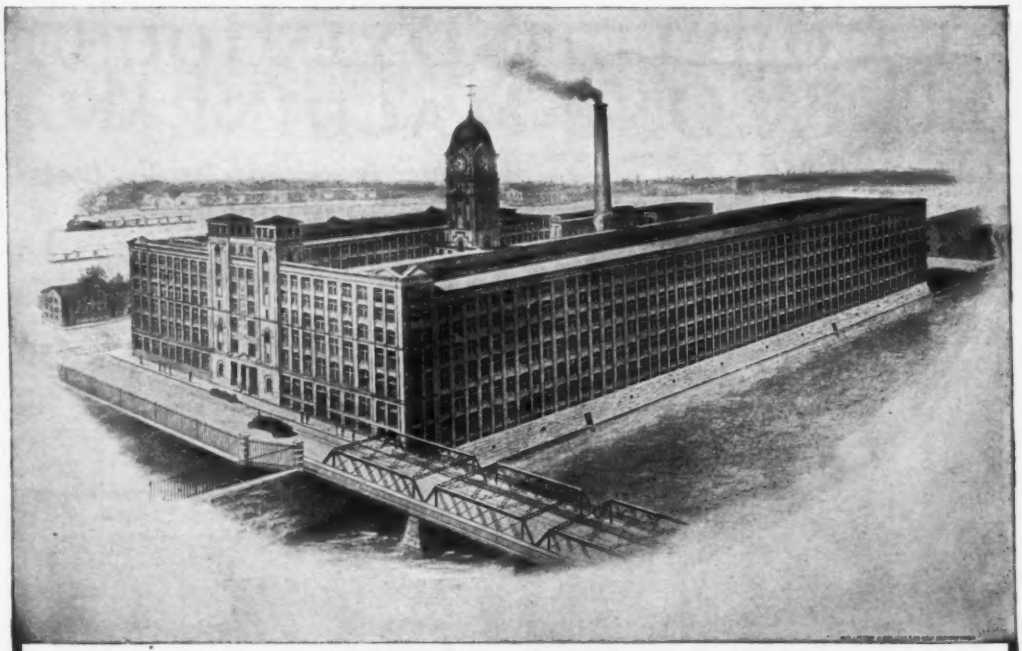
Tried our starch and was astonished at the results—smoother yarn and stronger, less breakage, quicker drawing in and tying in without stumbling, better separation, increased production.

SPECIAL WARP "CP" SIZING STARCH TRADE MARK

If you want to know what we can do for your mill in better results and increased production write

CORN PRODUCTS REFINING CO.
NEW YORK

Starch



AYER MILL, LAWRENCE, MASS.

The Largest Worsted Spinning Mill in the World

is Equipped with 6000 Horse Power in General Electric Motors

By using form L General Electric induction motors, driven by two 1500 kw. Curtis turbines, to operate its group drive the Ayer Mill has realized a number of the principal advantages of electric drive.

1. Real fuel economies have resulted from bleeding steam at 6 to 10 lbs. pressure from the two 1500 kw. Curtis turbines used—this steam being used in manufacturing processes.

2. Maximum production has been closely approximated by the elimination of a large number of slipping belts, which would have been necessary with a mechanical drive.

3. Perfect freedom was obtained in the location of mill and power plant by the use of electric drive and also in the location of machines within mill.

4. Improvement in product was obtained by reduced breakage due to the perfectly steady drive. This is not possible where steam engines, with their varying torque or long line shafts, are used, as fluctuations too slight to be read by ordinary speed indicators are quite sufficient to cause breakage.

5. Power was sub-divided so that power required for each department is accurately known at all times and additions to a department may be made at any time without interrupting mill operation and without regard to location of machines.

6. One department can be operated overtime without operating long line shafts throughout the mill. This is especially valuable when the automatic looms are left running after weavers have gone home.

7. More continuous operation is gained since shutdowns are only local, affecting only a few machines. Manufacturers, who can buy yarn when preparatory machinery fails, but not cloth to fill their orders, appreciate this feature.

8. Reduction of repair account was obtained due to the smooth and steady speed, the elimination of all heavy belts and long shafting and the use of short shafting, which stays aligned and is not liable to accident or injury. All mills using General Electric Company motor drive report that its repair cost is negligible.

As pioneers in this field, with 75% of all electric textile mill power going through our motors, we are in a position to give you expert advice—candid and impartial—on the best drive for your mill.

We will carefully study your problem if you write us.

GENERAL ELECTRIC COMPANY

Mill Power Dept.
BOSTON, MASS.

Principal Office: Schenectady, N. Y.

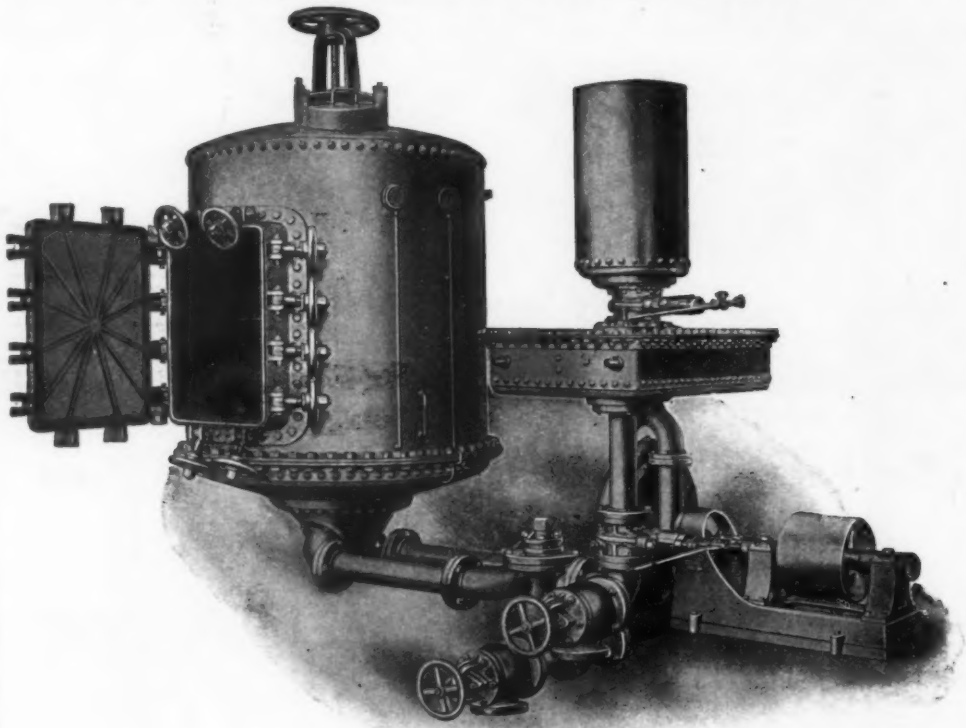
Sales Offices in all large cities

2099

A COMPLETE DYE-HOUSE IN ONE MACHINE

Colored Goods Manufactured by use of same Winding Processes as Grey Goods

ELIMINATES SKEIN WINDING and WARPING



FRANKLIN DYEING MACHINE

(Patents pending in the United States, Canada and principal Foreign Countries)

For COTTON, WOOL and WORSTED YARNS

Dyes Cotton in the Lap—Wool in Card-Ball—Worsted in the Top

MACHINES IN PRACTICAL OPERATION IN MILLS DEMONSTRATE A

Saving of 25 to 30 % in Dye-Stuffs and 75% in Labor Cost

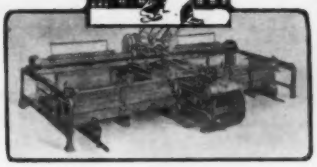
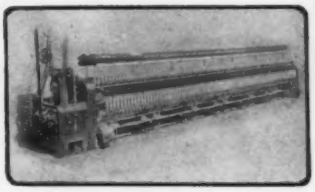
NO HYDRO-EXTRACTOR REQUIRED

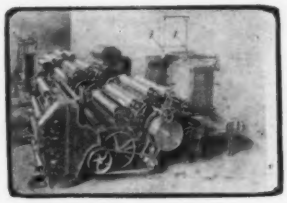
FRANKLIN PROCESS COMPANY

P. O. Box 465, Providence, R. I.

SÆCHSISCHE MASCHINENFABRIK
RICHARD HARTMANN

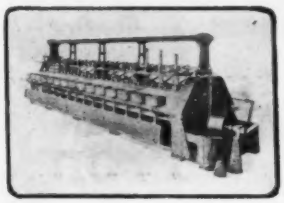
CHEMNITZ TRADE MARK GERMANY

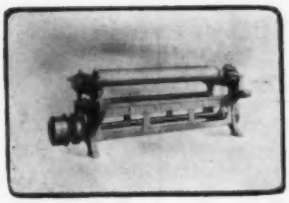





Spinning Machines

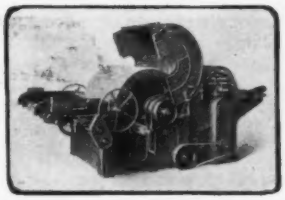
Preparatory Machines for woolen and worsted yarns, cotton waste and silk waste yarns.

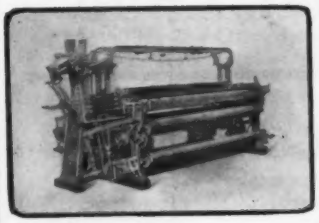
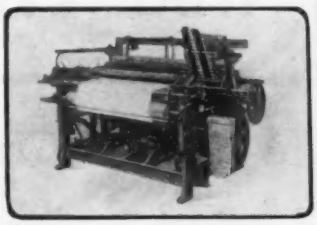
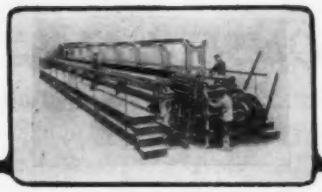




The HIGHEST STANDARD in design and construction.

Looms for every purpose; Heavy, Medium and Light, Woolen, Worsted, Felt, Asbestos, Linen, Silk, Upholstery and Cotton Looms



AMERICAN REPRESENTATIVES:

SZEPESI & FARR 141 MILK STREET BOSTON, MASS.

ANNOUNCEMENT

A Full Line of

"Westinghouse Wire Type Tungsten Lamps"

All Sizes

From 25 to 500 Watt

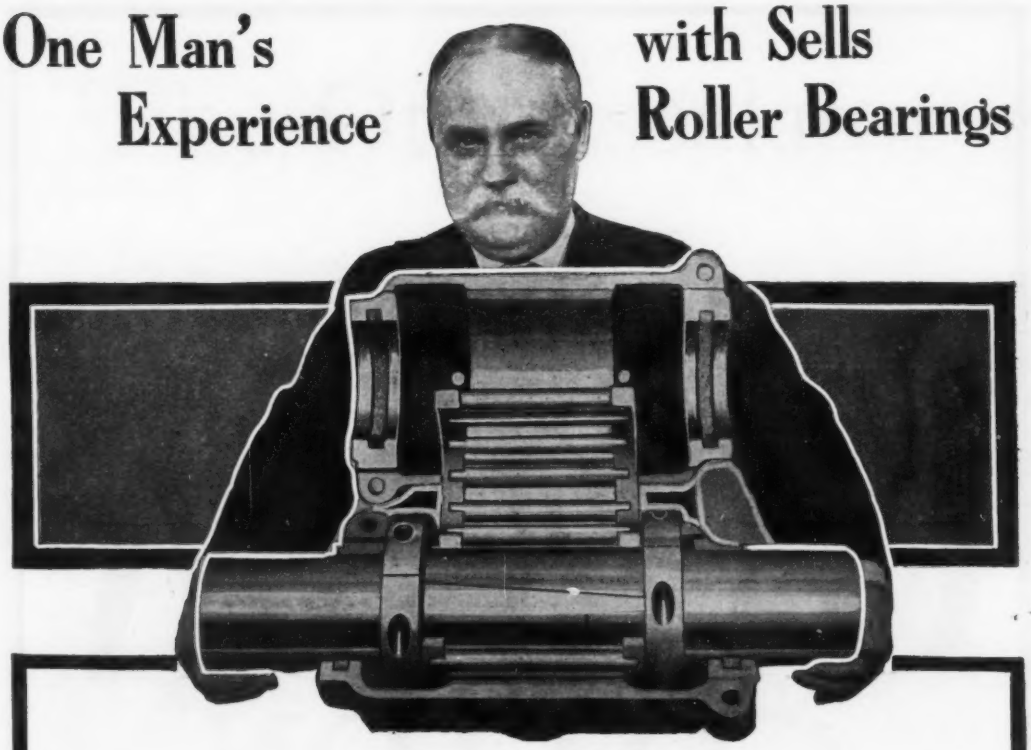
Complete Stocks Carried
in All Principal Offices

THE ONLY "WIRE TYPE TUNGSTEN LAMP"

WESTINGHOUSE LAMP COMPANY

GENERAL OFFICE AND WORKS
BLOOMFIELD, N. J.
P. O. BOX 128
New York Works, 510-532 West 23d Street, New York City
SOLD BY
Westinghouse Electric & Mfg. Co.
SALES OFFICES IN ALL PRINCIPAL CITIES

One Man's Experience with Sells Roller Bearings



WRIGHT WIRE COMPANY,
Worcester, Mass., December 16, 1910.

ROYERSFORD FOUNDRY AND MACHINE CO., Philadelphia, Pa.
Dear Sir: Attention of Mr. Sells.

Referring to our conversation with you regarding the installation of your roller bearings in our plant here at Worcester, about eighteen months ago, beg to say that they have given excellent satisfaction and unquestionably shown saving in power. We would also say that half of the time these bearings have been running night and day.

Yours truly, WRIGHT WIRE COMPANY,
ACL/MVM (Signed) A. G. Lorion, Purchasing Agent.

This shows just what the Sells is doing. Besides saving 50% to 65% of your friction load Sells Roller Bearings cost 40% less than any other.

Send for the other big advantages of these Sells Bearings, a number of other testimonial letters from Sells users and full information. Write to us today.

Manufactured by

Royersford Foundry and Machine Co., Inc.

MANUFACTURERS OF

Power Transmission Machinery and Punching and Shearing Machines

56 N. FIFTH ST., PHILADELPHIA, PA.

European Office: THEODORE BUTLER, Ltd.
149 Queen Victoria St., London, E. C.

ROLLERINE

Have you heard of "Rollerine"? It's a high grade lubricant, especially compounded for roller and ball bearings, and fills the long felt demand for a perfect lubricant for this kind of work.

COUPON

Gentlemen: Replying to your ad. in Textile World Record, April, send me booklet and all information regarding Sells Roller Bearings.

Name.....
Firm .....
Firm Address.....
Business.....
Bearings now in use.....

DIRECT IMPORTS
OF

CHINA
COTTON

Also of Egyptian and India Cottons

L. H. A. SCHWARTZ & CO., 53 State St., Boston

Special Imported Finishing Machinery of all kinds for Woolen and Worsted and Cotton Yarns and Cloth

The Otis Escalator

Do not confuse the Otis Escalator with a moving incline belt or chain, because the Otis Escalator is a perfectly formed flight of stairs moving upwards.

When at rest, as shown below, the Escalator makes a perfect staircase.

The illustrations shown here are actual photographs made of two Escalators, empty and loaded, in the American Woolen Mills at Lawrence, Mass. Since the first four Escalators were installed in this plant the owners have added four more

These Escalators have proven their worth by landing the employees at their looms at the various floors in a more efficient condition for work than if they had walked.

These Machines at noon and at closing time carry the employees down.

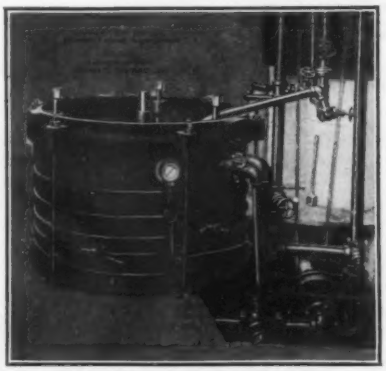
Otis Elevator Company

Main Office, 17 Battery Place, New York City

Offices in all Principal Cities of the World

UP TO THE MINUTE

WOOL AND WORSTED TOP DYEING



IN THE

PSARSKI DYEING MACHINE

PRACTICAL

ECONOMICAL

THOROUGH

UNIFORM COLOR

Dyes Wool and Tops—100 per cent. of Batch—absolutely level color throughout.

NO FELTING

The Mass—Dormant While Dyeing—Cannot be Felted. Fibre comes out as Alive—Soft—Elastic and Spinable as it was Before Dyeing.

DYES LOOSE WOOL

Acid Colors	2,000 pounds per day
Top Chromed Colors	1,500 " "
Bottom Chromed Colors	1,000 " "

DYES TOPS

Fine Wool	500 pounds per batch
Coarse Wool	800 " "

THREE BATCHES PER ELEVEN HOUR DAY

Tops are packed rapidly and easily. No special system or building. Tops are dyed uniform color throughout.

NO FELTING—NO RE-COMBING—NO ADDITIONAL NOILS
SAVES 5 TO 10c. PER POUND OVER OTHER MACHINES

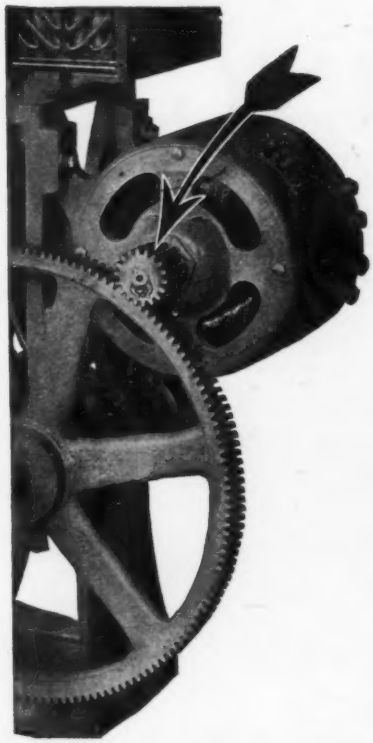
SAVES 90 PER CENT. STEAM OVER HAND KETTLE OR REVOLVING MACHINES
SAVES DYES—LABOR—WATER

IS SIMPLE—STRONG—COMPACT—DURABLE
PRACTICALLY NEVER NEEDS REPAIRS

THE PSARSKI DYEING MACHINE CO.

3167 Fulton Road :: :: CLEVELAND, OHIO

THAT NEW PROCESS NOISELESS PINION

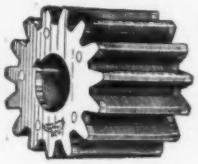


Insures a smooth quiet drive regardless of load variations, speed or wear of the gears or bad lubrication. The makers of the well known motor and geared pump shown could use a metal pinion here at slightly less expense to themselves, but **the New Process Noiseless Pinion is infinitely more satisfactory to the customer.** Its use here as elsewhere is one of the evidences of good design and material that have made certain makes of apparatus justly popular with discriminating buyers.

As a machine manufacturer, you can save yourself expense from renewals of broken gear teeth and prevent dissatisfaction among customers by using New Process Pinions to stop noise and cushion vibration.

As a machine user, you can also protect yourself from vexatious delays, prolong the life of delicate machine parts, preserve their accuracy, sometimes keep your product up to a higher standard, and always get ultimately better service from New Process than from metal pinions on high speed drives.

New Process Pinions are sold upon a guarantee of absolute satisfaction. You have nothing to lose by testing their worth on one drive or specifying their installation when buying new machines. Want our booklet?



NEW PROCESS IS TO ALL OTHER RAWHIDE AS STEEL IS TO IRON.

The NEW PROCESS RAW HIDE Co.

OFFICE & WORKS SYRACUSE, N.Y.

N.P.R.H. REGISTERED

EELSKIN

TRADE MARK

Solid Woven Cotton

BELTING

Eelskin Belting, Fine Weave, Actual Size.

A very strong, pliable belt that is suitable for pulleys of any size and adapted for the most severe classes of work.

"EELSKIN" belting is waterproof, has no laps, seams or stitches, is not affected by heat, cold, oils, grease and fumes of acids.

Write for sample and descriptive literature.

Made by

BOSTON BELTING CO.

Manufacturers of

High Grade Mechanical Rubber Goods

Home Office and Factories: BOSTON.

Branches:

NEW YORK 100-102 Reade Street

BUFFALO 90 Pearl Street

CHICAGO 169 W. Lake Street

PHILADELPHIA 722 Arch Street

BALTIMORE 119-121 E. Lombard Street

ATLANTA 40-46 S. Forsyth Street

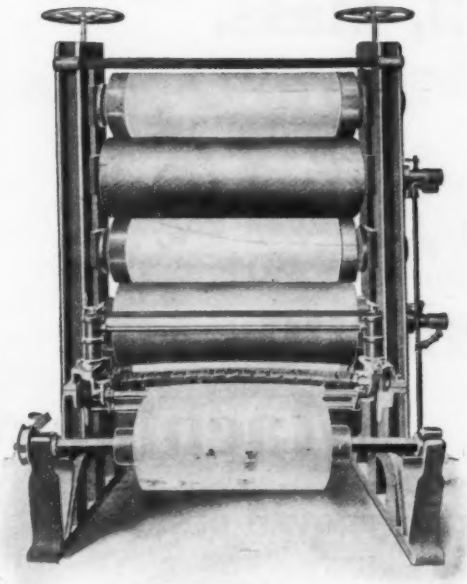
THOMAS LEYLAND & CO.

Sole Manufacturers and Agents for United States and Canada for

The William Mycock Textile Machinery Specialties

60 INDIA STREET, - - BOSTON, MASS.

F. T. WALSH, Manager



The William Mycock Regulating Cloth Expander

(PATENTED)

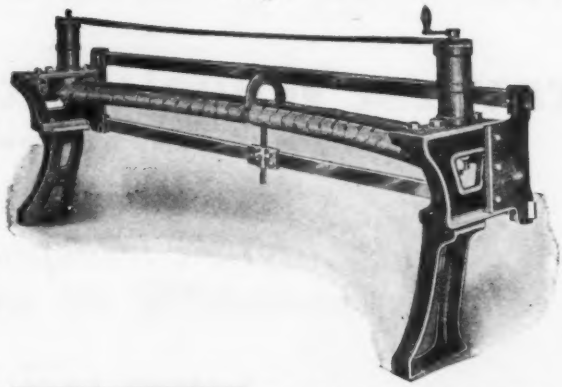
This cloth expander does not in any way disturb the surface of the cloth, even on napped goods. It brings goods to any desired width without strain, the stretching taking place uniformly over the entire width. The result is that the weft is undisturbed being left at right angles with the warp.

The cloth is operated upon on both sides, therefore, there is no folding or creasing of selvedges.

This expander is very powerful and where an excessive width is not required does away with stentering.

Wide Expander With Center Support

The center support gives this expander the necessary strength, and allows width not otherwise obtainable. We have made this wide expander up to 125 inches in width.



Improved Free Running Scutcher Guides and Openers **New Patent Pneumatic Beetle** **Portable Sewing Machines** **Whale Back Sewing Machines**

When in doubt call in a SPECIALIST, and this we claim to be for opening or stretching cloth.

FRANK B. KENNEY, Pres't and Mgr.

T. C. Entwistle Co.

Lowell, Mass.

Warping
Balling and
Beaming
Machinery

OF THE

LATEST AND MOST IMPROVED DESIGNS

Also All Kinds of

EXPANSION COMBS FOR WARPERS, BEAMERS AND SLASHERS

Traverse Wheel and Roll Grinders

For All Makes of Cotton and Woolen Cards

We gladly invite correspondence on all subjects pertaining to our machines

Southern Agent,

J. H. MAYES, - - Charlotte, N. C.

FIG.22.

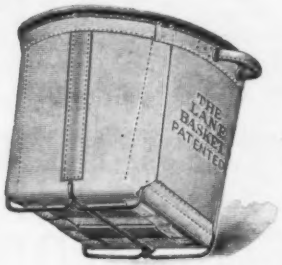


FIG.39

Lane Canvas Mill Baskets

Light Weight, Smooth
Moderate First Cost
Great Durability
Lowest Ultimate Cost

CONTRIBUTE MATERIALLY TO ECONOMICAL TEXTILE OPERATION

SEE OUR CATALOGUE No. 42

ORIGINATED AND MANUFACTURED ONLY BY

W. T. LANE & BRO.,

POUGHKEEPSIE, N. Y.

Sold Direct and Through All Leading Mill Supply Houses

FIG.20.

FIG.27

IMITATED
BUT NOT
EQUALED

In the sifting process—the process of selection and elimination—the

"ARGUTO SADDLE"

has steadily and persistently risen to the top.

Everyone points—today—to the "Arguto" as the standard.

It is a fact so obvious that as soon as the word "Arguto" is spoken you know that a eulogistic comment will follow.

Specify——— —"ARGUTO"

"IMITATION IS SINCEREST FLATTERY"

ARGUTO OILLESS BEARING CO.

WAYNE JUNCTION, PHILADELPHIA, PA.

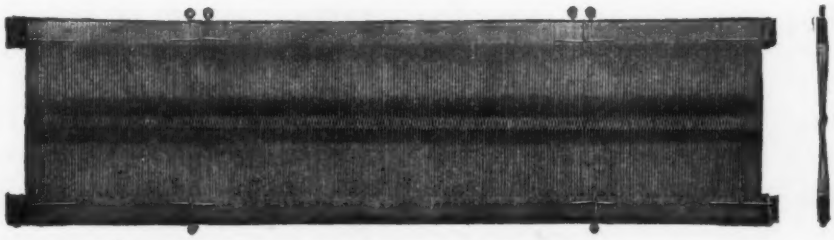
COPYRIGHT 1911 BY ARGUTO OILLESS BEARING CO.

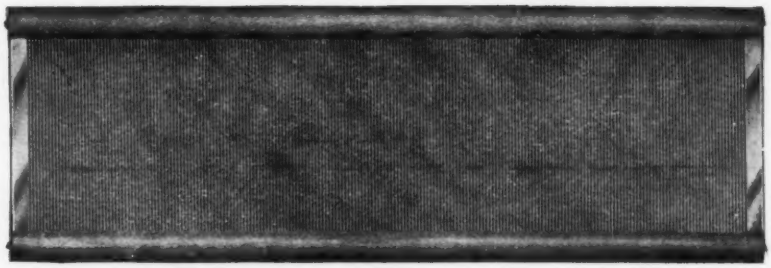
EMMONS LOOM HARNESS CO.

May Street, Lawrence, Mass.

MANUFACTURERS

Cotton Harness, Mail Harness and Reeds for Cotton, Duck, Worsted and Silk Goods





Selvedge Harness, any depth up to 24 inches for weaving tape selvedges.

Beamer and Dresser Hecks.
Mending Eyes and Mending Twine.
Slasher and Striking Combs.
Warper and Leice Reeds.

The Words *Majority* and *Right* are not Synonyms

Distribution is the big end—the brains end, the costliest end—of almost any business, startlingly so in Textiles.

Manufacturing perfection, generally speaking, has its known limits. It is possible to tell pretty nearly when they have been reached.

Selling perfection is a thing too enormous—to vague—to ever be attained.

Selling is the common ground on which manufacturers of goods of equal quality must of necessity fight out their battle.

The old school Textile manufacturers through custom, indifference and lack of experience are largely neglecting the merchandizing end, delegating its direction to outside parties and focusing their attention on manufacturing pure and simple.

But there exists a growing class—still far in the minority—of foresighted textile men who are bending their every effort toward familiarizing themselves with merchandizing—who are studying its problems, seeking new methods, welcoming every suggestion and plan. They are aiming to *own* their *own* business, to be the big factor in its direction from start to finish.

History will some day tell the story. Before now it has recorded the downfall of a powerful majority.

When its final verdict on this question is rendered, see if advertising, with its effect on merchandizing methods and trade conditions, has not played a leading role.

Isn't it worth your while to give this some real thought? Would you be willing to discuss it with us?

Textile Department

THE CURTIS PUBLISHING COMPANY

BARRISTERS HALL, BOSTON

The circulation of THE LADIES' HOME JOURNAL is over 1,400,000 a month. That of THE SATURDAY EVENING POST is over 1,600,000 a week. We have reached this commanding position in our field by the same merchandizing methods we propose to you.

A new profit on hosiery

The Scott & Williams automatic seamless hosiery machine — by reducing the cost of production—has created a new manufacturing profit.

This machine saves labor, time and material. It makes hosiery complete—feet, rib-top and all—in a continuous string. No skilled topper is needed. One unskilled operator attends to 15 or 16 machines. One adjuster easily looks after 75 to 100. And they can be operated continuously day and night.

Needle-breakage, menders and waste are reduced to a minimum. And a steady output is assured regardless of skilled operators.

One prominent hosiery manufacturer asserts that his saving by the use of this machine is 7 cents per dozen on half-hose. On ladies stockings it is more.

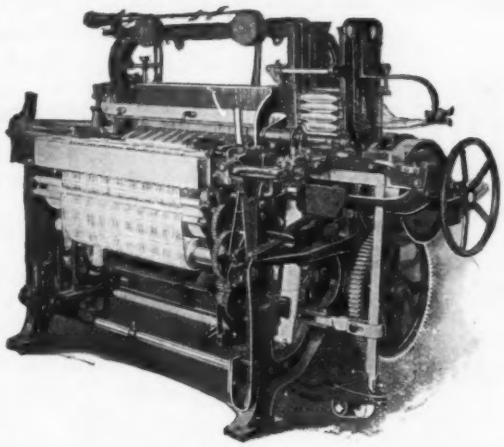
Hadn't you better look into this?

Scott & Williams, Inc.

Machinery for Knitting Mills

2079 E. Cumberland Street **Philadelphia, Pa., U. S. A.**

Crompton & Knowles Automatic Loom



Weave perfect goods and reduce weave room expense.

Crompton & Knowles Loom Works Worcester, Providence Philadelphia

SMITH, DRUM & CO.

"BUILDERS OF THE BEST"

Labor Saving Machinery for Dyeing, Singeing and Finishing

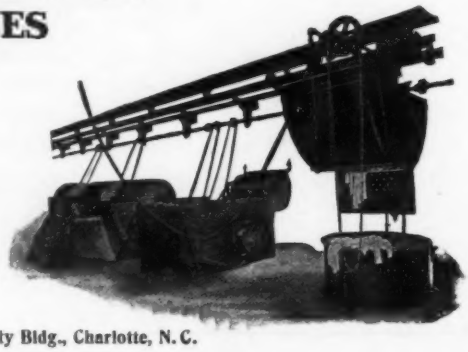
HOSIERY

IN SULPHUR, ANILINE, DEVELOPED BLACKS AND COLORS
POWER SCREW PRESSES and MERCERIZING MACHINES

SAVE LABOR and **DYE STUFF** and do **BETTER WORK** in your dye house by using

SMITH, DRUM & CO. MACHINES

Full Particulars on Application



CORAL AND CUMBERLAND STREETS

PHILA., PA.

Southern Agent, H. G. MAYER, Realty Bldg., Charlotte, N. C.

LAWSONS

Hope Foundry, LEEDS, England

BRANCH OF

Fairbairn Lawson Combe Barbour, Ltd.

MAKERS OF MACHINERY FOR

Preparing and Spinning

Flax, Hemp, Tow and Jute

Special Machinery for the Manufacture of Twines, Rope Yarns and Binder Twine

Good's Combined Hackling and Spreading Machine.

Long Reach Screw-Gill Drawing Frames. Chain-Gill Drawing Frames with Apron Heads.

Patent High-Speed Horizontal and Automatic Spinning Frames for Manila.

Improved Laying Machines.

Haskell-Dawes Tubing Twisters.

Brownell's Patent Twisting and Laying Machines for Twine.

N. B.—Complete Plans and Estimates for Flax, Tow, Hemp and Jute Mills, Trawl Twine Factories and Steam Ropeworks.

From the Log to the Finished Bobbin is simple work for

"Defiance Wood-Working Machines"

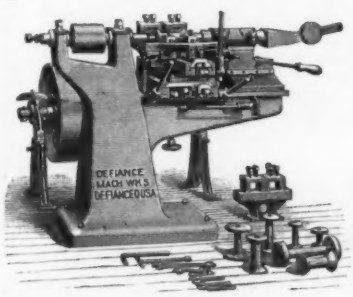
the kind that have been adopted by fifteen different governments in fifteen different lands.

Single machines and complete equipment for manufacturing spokes, rims, hubs, wheels of every kind, wagon, carriage and automobile wood work, handles of every description, shafts, poles, neck yokes, single-trees, hoops, chair and table legs, insulator pins, oval wood dishes, a general line of wood working machines as well as a special line of

Spool and Bobbin Machinery

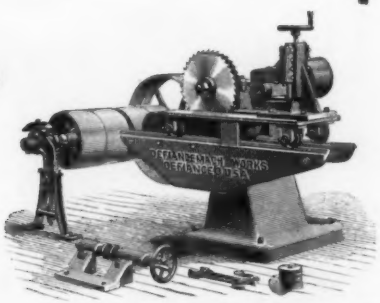
all designed, patented, built and guaranteed by

THE DEFIANCE MACHINE WORKS
DEFIANCE, OHIO



Spool Turning Lathe.

Bobbing Boring Machine.


Spool and Bobbin Disc Dividing Saw.

Cloth Washers, Dye Tubs, Vats, Fulling Mills,
Piece Dyeing Machines, Special Machinery,
Brass Founders, Tanks, To Order.

Hopkins Machine Works, Inc.

BRIDGETON, R. I.

Providence Office, 49 Westminster St.

Spindles and Flyers, for Cotton, Wool, Silk, Flax, etc.

Send for our latest Catalogue and Price List

Dye Tub Valves, Cloth Guides, etc.

Bronze or Porcelain Rings.

Conservation of Power with Westinghouse Textile Motors.
A Great Stride in Textile Manufacturing Economy.

Every textile man who keeps up to date in all phases of that industry's development, should make himself familiar with the Westinghouse Textile Motor.

In this motor the special conditions and needs of the textile industry have been met as they were never met before. Its use, individually driving the machinery of a textile mill, has decreased the cost of power from generator to machine to a remarkable extent.

These textile type motors are lint proof and dust proof—bearings, windings, frame and rotor. While having no air ducts—rotor is solid from shaft to periphery—the material is so distributed that the motor is very cool in operation. All textile motor windings are perfectly and completely protected from mechanical injury.

Bearings — completely enclosed — are from twenty-five to fifty per cent. larger and harder than those of other standard motors, and reservoirs can easily be filled without deluging the mill with oil. These few special characteristics show how completely this motor fits into the textile mill.

But the big point of saving is in the special design of each motor for the machine it has to run. Special windings for special service.

Learn more about this. Send to nearest district office for special textile motor information. The progressive mill man cannot afford to be without it.

Westinghouse Electric & Mfg. Co.
PITTSBURG, PA.

Sales Offices in All Large Cities

Darrow-Mann Company

New River Coal Co.'s
NEW RIVER COAL

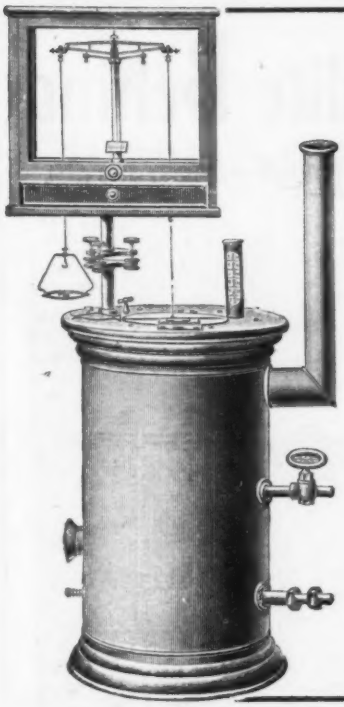
South Fork Bituminous
All Rail and Tide Water

Lincoln Gas Coal and Gas Slack
All Rail and Tide Water

Nos. One, Two and Three, Buckwheat

The Marshall Building
40 Central Street

BOSTON, MASS.



ENGLISH COTTON SYSTEM

840 yards of COTTON to one pound = No. 1 allowable moisture, 8½%.

ENGLISH WORSTED SYSTEM

560 yards of WOOL to one pound=No. 1 allowable moisture, 18¼%.

LEGAL DENNIER SILK SYSTEM

450 meters of RAW SILK to .05 grammes=No. 1, allowable moisture, 11%.

The Conditioning House is at your disposal, to tell you the RIGHT NUMBER of that certain yarn; how much water and how much fibre.

If it is too expensive to send every single lot to the Conditioning House, why not have an apparatus of your own? It is a handy little instrument, worthy of a space in your office. The cost of a hundred tests will pay for the machine.

You can see the apparatus at work with many other testing machines in our office. Drop in when in Boston next time.

SZEPESI & FARR, 141 Milk St., Boston, Mass.

Sole Agents in the United States for F. R. Poller, Leipzig, Germany, makers of testing machines since 1708.

Have you our Catalogue?

JAMES SPEED HARRY STEPHENSON

SPEED & STEPHENSON,

170 Summer Street, Boston, Mass.

Sole Agents in the United States and Canada for

J. B. FARRAR & SONS, **HALIFAX, ENGLAND.**

WORSTED MACHINERY

Including Gill Boxes, Drawing, Roving, Spinning, Twisting and Yarn Finishing Machinery.

JOHN DAWSON, LTD.,
Wool Washing and Carbonizing Machines.

JAMES SMITH & SON,
Improved Noble Combs and Ball Winders.

DAVID SOWDEN & SONS,
Looms for Men's Wear, Dress Goods, Linings, &c. Improved Dobbys & Jacquard Machines.

WILSON & CO., BARNSLEY, LTD.
High Class Mill Bobbins.

THOMAS BLACKBURN,
Spindle Bands and Tape.

JOHN HETHERINGTON & SONS, LTD.,
Improved Worsted Cards and Mules, Duplex Woolen Cards with Josephy Tape Condensers, to take off up to 240 ends. Improved Woolen Mules, Fearnaughts, &c.

HEARL HEATON & SONS,
Grinding Tackle and Emery Fillet.

S. HALEY & SONS LTD,
Card Clothing of every Description.

MILL SUPPLIES **Roller Leather, Combing Aprons, Bristles, and all Supplies used in a Worsted Mill.**

Machine Shop at Lawrence, Mass. For Repairs, Change Gears and Parts.

RICE'S MILL WHITE

HAS MANY

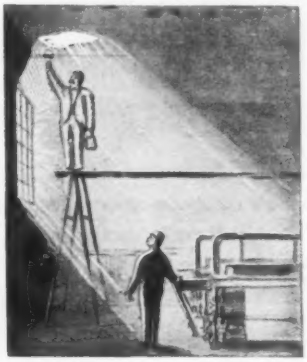
Sanitary Advantages

It contains no lead and is absolutely non-poisonous.

On account of its high gloss and impervious surface it can be kept thoroughly clean.

It gives you at comparatively slight cost the advantages of tiling.

By using our special primers first Rice's Mill White can be applied to brick, concrete or plaster, as well as to wood. And all dust, flyings, soot, grease and dirt from belting, etc., can readily be washed or brushed from these surfaces, keeping them always clean.



AND IT MULTIPLIES THE LIGHT IN YOUR MILL

You can, therefore, use Rice's Mill White on all your walls, ceilings, corridors, stairways, elevator shafts, etc., giving these places a firm, smooth, glossy surface.

Besides cleanliness this means that both the daylight and artificial light in your mill are multiplied and reflected into what would otherwise be dark places.

The net result is a material increase in sanitary conditions and an economical decrease in artificial lighting expenses.

Get the proof through the following:

FREE OFFER—IT PROVES OUR CONFIDENCE—We will send a gallon of Rice's Mill White free to any mill owner willing to pay expressage and mention this publication—ACCEPT IT TODAY

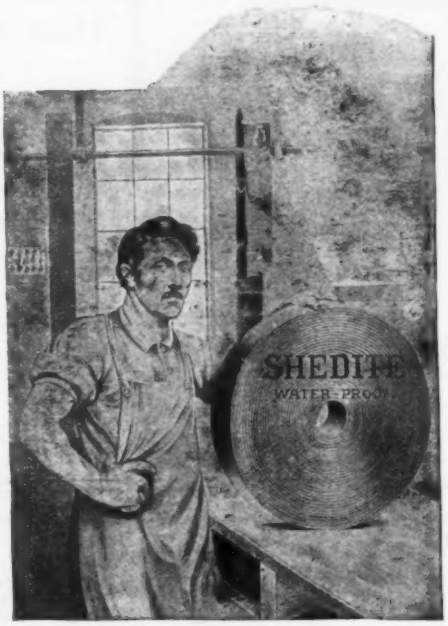
U.S. Gutta Percha Paint Co.

Originators of Mill White Paint

Dept. "A," PROVIDENCE, R. I.

Shedite Belting

Waterproof---Steamproof



For Dyehouses and Damp Places

In Textile Mills

Here is a "special purpose" belting, needed in some parts of nearly every mill, which is essentially of the high and well-known quality of our COCHECO belting. It is, however, made by a special process, with a specially prepared cement and material which give it a moisture-resisting quality, whether it be water or steam that is destroying your old belting.

This belting will be found more economical, more lasting, in fact, more satisfactory in every way for wet drives than any canvas, rubber, or other special belting.

It is made for exactly this purpose, and guaranteed to be what we claim for it.

Let us send you a catalogue and prices—prices based on quality only.

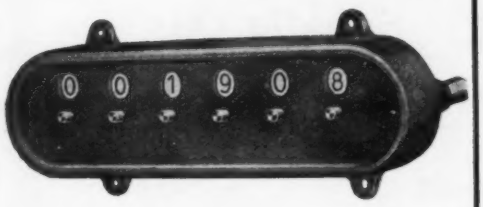
I. B. WILLIAMS & SONS

DOVER, N. H.

72 Murray Street NEW YORK — 157 Summer Street BOSTON

14 N. Franklin Street, CHICAGO

The Root Linear Counter



Helps Increase Profits By Decreasing Costs

Many of the most representative cotton mills and bleacheries are now using this counter, which accurately registers the output of each machine to which it is attached, in any unit form that you desire.

By keeping you informed just exactly what your output is, it prevents over-production, and insures a sufficient output without any waste of raw material.

The machine can be attached to looms, balling machines, twisters, dressers, folders, printing machines, rolling machines, etc.

With the help of this counter you can make reliable cost estimates and daily comparisons of the productive capacity of employees or machines.

If you want proof of the value of this machine—

Write for Catalog No. 18.

The C. J. Root Company

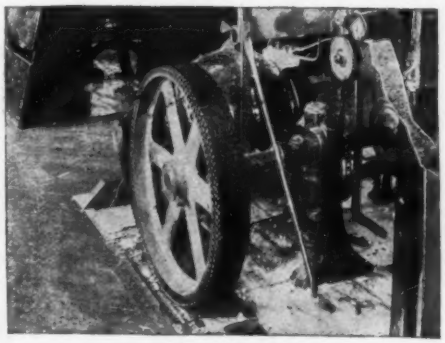
Bristol, Conn.

"MAXIMUM" SILENT CHAIN

FOR

Power Transmission

Write for Book No. 102-BB



The illustration shows 5 H. P. "Maximum" Silent Chain Drive operating line of Knitting Machines in Textile Mill. Note the compactness. The positive chain drive means increased production and fewer "seconds."

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

BOSTON, 131 State St.

Lubricants for Textile Mills

Loom Oils
Cylinder Oils
Dynamo Oils
Spindle Oils
Engine Oils
Machine Oils
Greases

BORNE, SCRYMSER COMPANY

ESTABLISHED 1874

80 SOUTH STREET, NEW YORK

BOSTON FALL RIVER PHILADELPHIA

17 Cents A Day Buys an

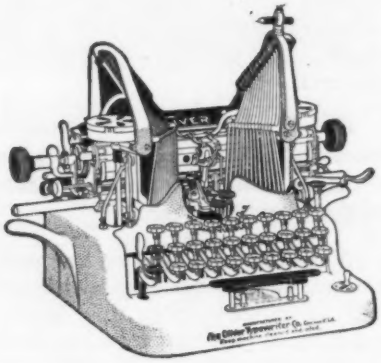
OLIVER

The Standard Visible Writer

Can you spend 17 cents a day to better advantage than in the purchase of this wonderful machine?

Write for Special Easy Payment Proposition, or see the nearest Oliver Agent.

The OLIVER TYPEWRITER CO.
69-71 Federal Street
Boston, Mass.



SAVE YOUR PENNIES AND OWN

The OLIVER Typewriter

Plant of B. F. Goodrich Co., Akron, O., covered with J-M Asbestos Roofing.

Made of indestructible Asbestos (rock) Fibre and Trinidad Lake Asphalt, the great weather-proofer, J-M Asbestos Ready Roofing is literally a pliable stone. Fire, acids, gases, chemical fumes, heat or cold have no effect upon it. It is therefore practically indestructible.

And because of its stone nature, J-M Asbestos Roofing never needs painting or graveling. Its first cost is its only cost. Asbestos being a non-conductor of heat and cold, this roofing keeps a building warm in winter and cool in summer.

Think what a protection J-M Asbestos Roofing would be to your building and what it would save you in paint and repair bills! It is adapted for any building anywhere.

We'll sell you J-M Asbestos Roofing direct from our nearest branch (also apply it if desired) if your dealer won't supply you.

Write our nearest Branch for Samples and Booklet.

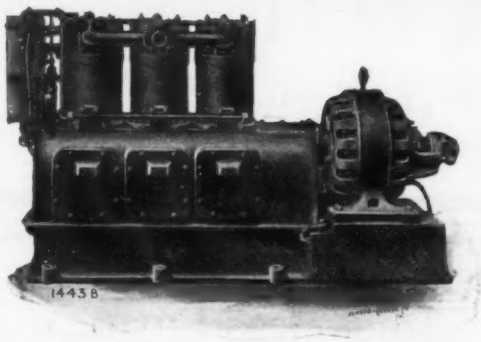
H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products — ASBESTOS — Asbestos Roofings, Packings, Electrical Supplies, etc.

Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas, Detroit, Kansas City, London, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburg, San Francisco, Seattle, St. Louis

For Canada:—THE CANADIAN H. W. JOHNS-MANVILLE CO., Limited
Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver, B. C.

(1294)



150 Cu. Ft. Type "3VS" Air Compressor with Alternating Current Current and Automatic Controlling Device.

National Air Compressors

Type "3VS"

A motor driven, direct connected, single stage air compressor, well adapted for service in Textile Mills. Simple and compact in design. All parts ruggedly built and accurately assembled, insuring long life, positive operation and maximum efficiency. Furnished with either direct or alternating current motor. Equipped with automatic controlling device. Capacities 50 to 300 cu. ft. of free air per minute.

Write for Publication M-87

National Brake & Electric Co.

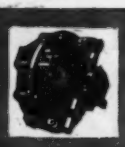
Milwaukee, U. S. A.

New York, 111 Broadway
Chicago, 1344 First National Bank Bldg.
London, England, 14 Great Smith St.
Pittsburg, 9th and Penn Ave.
St. Louis, 405 Security Bldg.

RODNEY HUNT MACHINE CO.

ORANGE, MASS., U.S.A.

HYDRAULIC AND MECHANICAL ENGINEERS



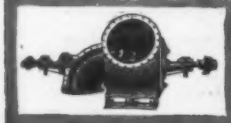
TURBINE WATER WHEELS — VERTICAL AND HORIZONTAL, HEAD GATE GEARING, REGULATORS, AND EVERYTHING PERTAINING TO WATER WHEELS AND MILL WORK.

IRON FLUMES AND PENSTOCKS.

McCORMICK TURBINES CYLINDER and BALANCE GATES

CLOTH FINISHING MACHINERY — INCLUDING ROTARY FULLING MILLS, CLOTH WASHERS, ROTARY COMBINED FULLING MILL AND WASHER FOR KNIT GOODS. ALSO ROTARY DYING MACHINES FOR CLOTH AND KNIT GOODS, AND HAMMER PUSHERS FOR FELTS, KNIT GOODS, ETC.

SOAPING MACHINES.



UNDERWRITER ROTARY FIRE PUMPS, NATIONAL STANDARD TYPE A AND B MOTOR OR FRICTION GEAR DRIVE.

BRANCH OFFICE, 70 KILBY ST., BOSTON

CATALOGUE AND CIRCULARS FREE

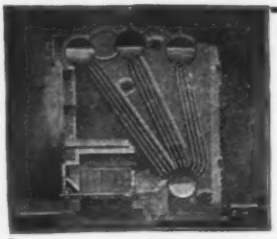
SALEM ELEVATOR WORKS

SALEM, MASS.

ELEVATORS

ESPECIALLY ADAPTED FOR MILL USE.

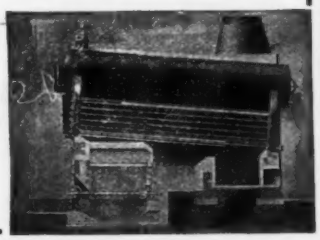
SEND FOR ILLUSTRATED CATALOGUE AND ESTIMATE.



The Murphy Automatic Smokeless Furnace

Burns Slack with Great Economy

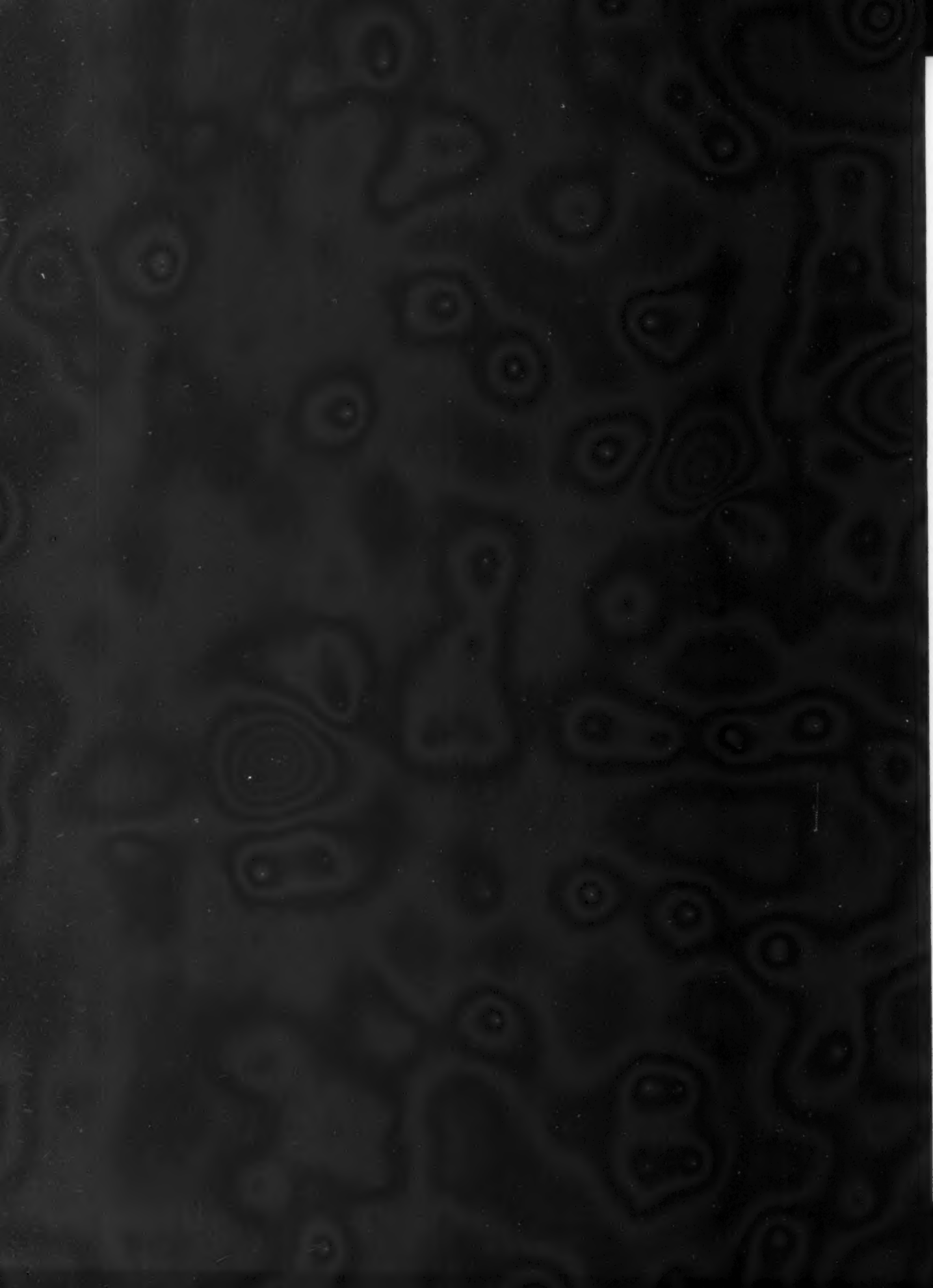
The Murphy can be installed under any type of fire-tube or water-tube boiler and to units of any size.



SETTING UNDER TWO TYPES OF BOILERS SHOWN HEREWITH

MURPHY IRON WORKS

DETROIT, MICH.



Buckeye Illumination for Oswegatchie Mills

The lighting of the mills of the Oswegatchie Company, Buffalo, N. Y., is another example of Buckeye ***practical*** results. The picture speaks for itself. It shows a weave shed in which every operation is properly illuminated to facilitate work, to save stoppage and to obviate floats, overshots and other faults in the finished piece. The illumination of this mill was given to our

Industrial Lighting Department

only after considerable experimenting and very careful study on the part of the owners. We are pleased to refer to the Oswegatchie Manufacturing Company regarding the cost, maintenance and practical, money-saving operating results of this installation.

The Buckeye Electric Company

CLEVELAND, OHIO

CHICAGO PITTSBURG BOSTON DALLAS

RmCo

Rabbeth Centrifugal Clutch Spindle.

CARRIES BOBBINS AT UNIFORM LEVEL

PRODUCES MORE EVEN TWIST

FILLING BOBBINS CARRY TEN PER CENT. MORE YARN

THE ONLY REAL IMPROVEMENT IN SPINDLES FOR YEARS

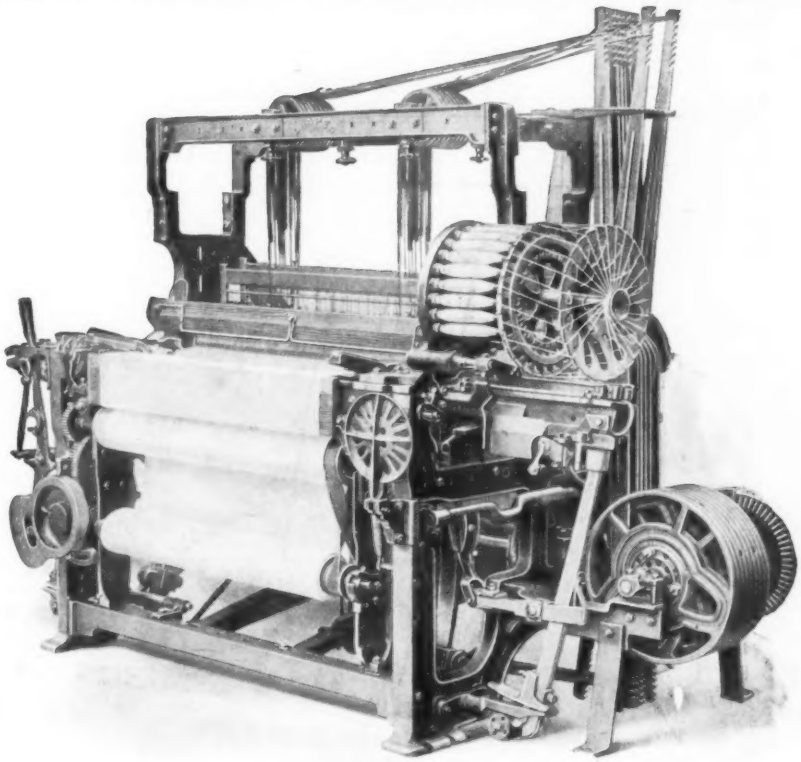
DRAPER COMPANY

HOPEDALE, MASS.

J. D. CLOUDMAN, Southern Agent,

No. 40 South Forsyth Street, - - - - - Atlanta, Ga.

NORTHROP
SIDE CAM CORDUROY LOOM

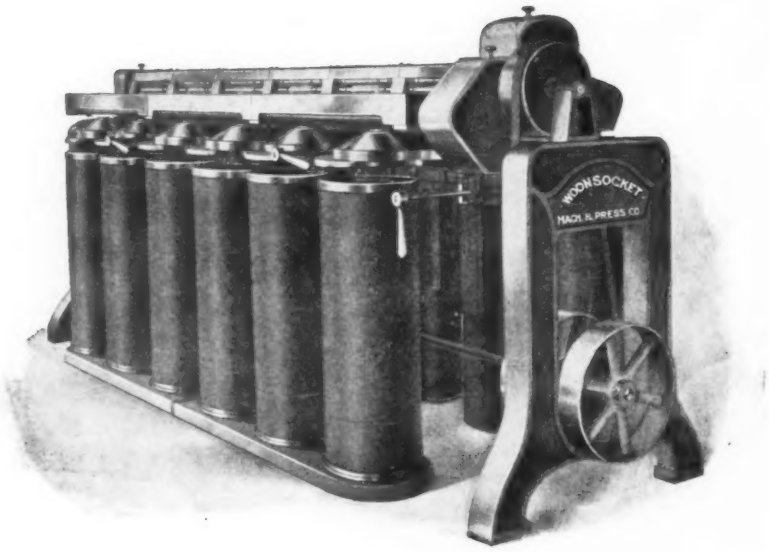


Twenty Looms per Weaver

DRAPER COMPANY
HOPEDALE, MASS.

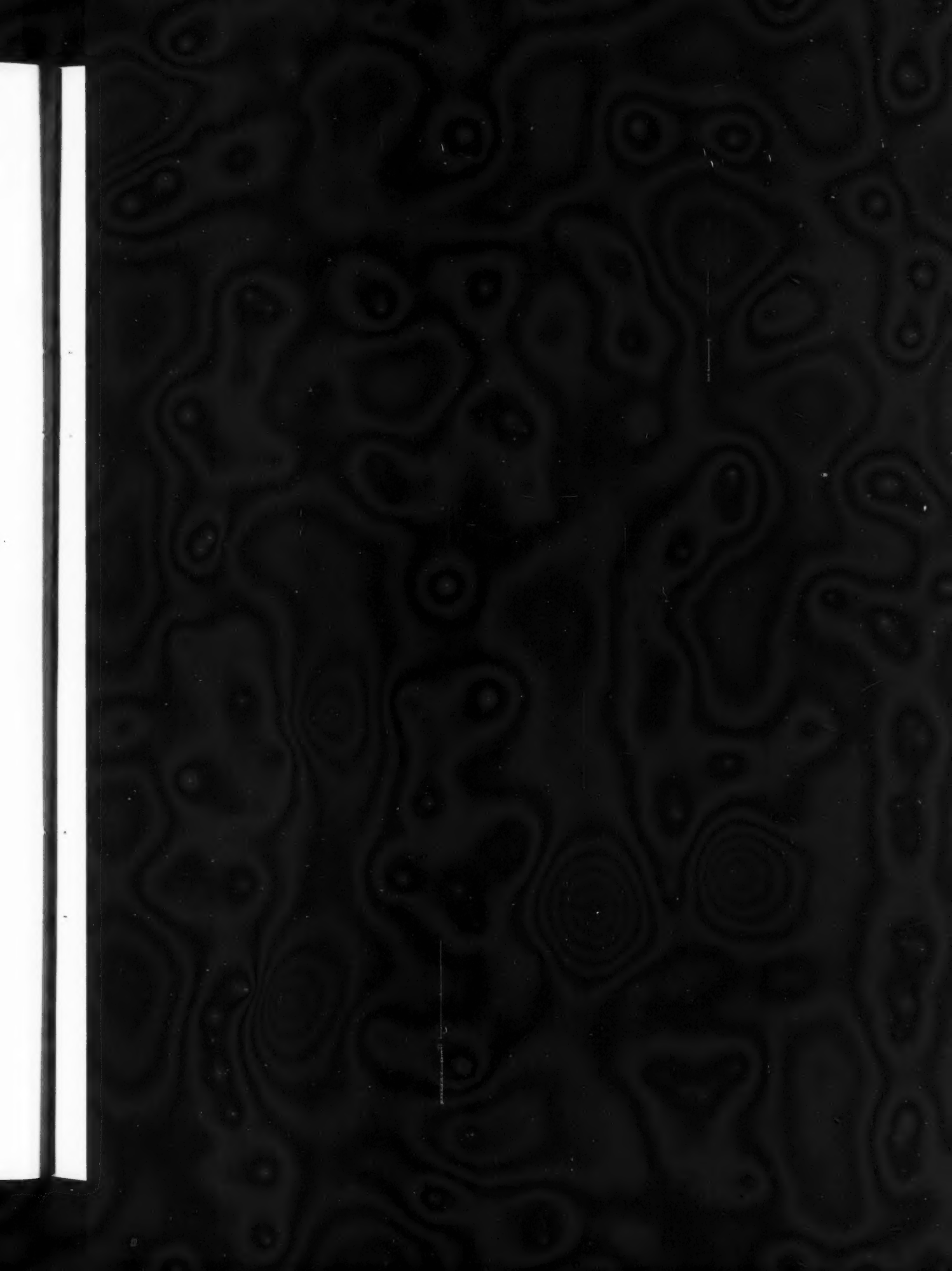
J. D. CLOUDMAN, Southern Agent
40 South Forsyth Street, Atlanta, Ga.

IMPROVED
DRAWING FRAME



Woonsocket
Machine and Press Company
Woonsocket, R. I.

Southern Agent, J. H. MAYES, Realty Bldg., Charlotte, N.C.



Now for Gentle Spring!

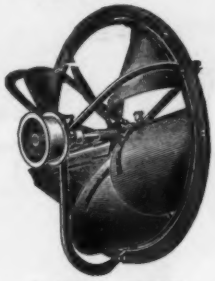
If you haven't tried a

Berry Fan

Try one now for Drying and Ventilating

Those who have tried them always use them

This is our Berry Wheel, the most effective agent on the market for drying, eliminating steam and other impurities in the atmosphere.



A. HUN BERRY,
23 West First Street.
BOSTON.

WILLIAM BODDEN & SON, Limited

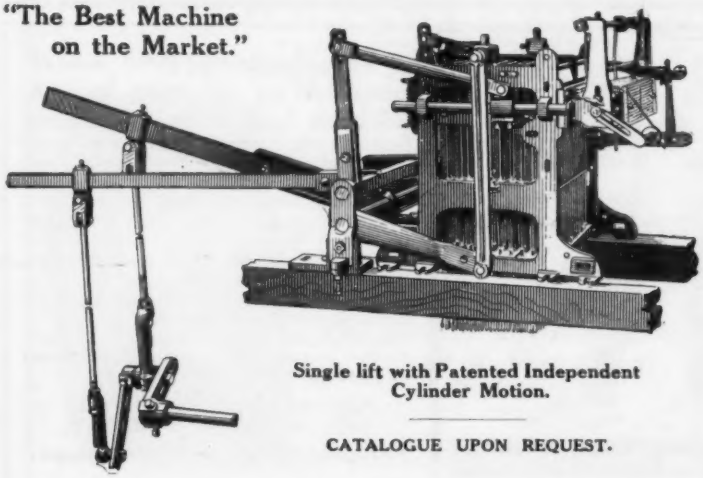
The "BODDEN" Flyer

For QUALITY OF FINISH
For QUANTITY of PRODUCTION
HAS STOOD THE TEST OF YEARS

Sole Agents for U. S. A.

Thomas Mayor & Son, Olney Street, **Providence, R. I.**

"The Best Machine on the Market."



Single lift with Patented Independent Cylinder Motion.

CATALOGUE UPON REQUEST.

USE THE

Halton Jacquard

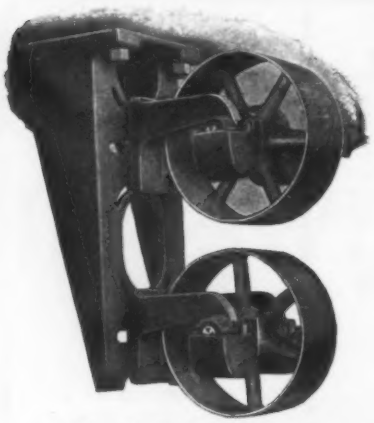
Original Fine Index Machines

Single Lift, Double Lift, Double Cylinder, Rise and Fall, Crossborder.

Thomas Halton's Sons,

Allegheny Avenue and C Street
PHILADELPHIA

Representative
H. A. Forbes, Paterson, N. J.



Adjustable Binder Frame for belt drives to Spinning Frames, Twisters, etc.

WM. SELLERS & CO., Incorporated

Philadelphia, Pa.

Makers of

Shafts,
Couplings,
Pulleys,
Hangers,

and all most approved appliances for the

Transmission of Power by Belts, Gears or Ropes

Catalogue upon request.

Machine Tools,
Injectors, Power Cranes.

PATENTED

Reasons why YOU should use

"THE AMERICAN"

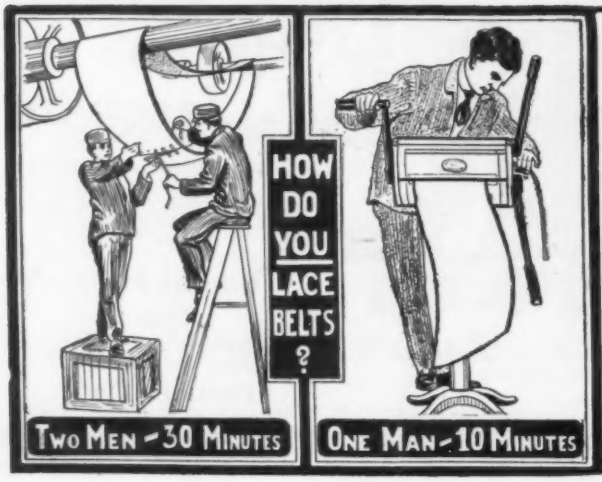
wrought steel pulley.

It is better than the ordinary cast iron pulley because of its lightness, convenience and safety. It cannot burst.

It is preferable to a wooden pulley because it is not affected by heat or moisture, and will hold firmly to the shaft without Key or Set Screw—NEVER SLIPS. Specify "The American" the most up-to-date and satisfactory Pulley in the world. Sold by dealers everywhere.

THE AMERICAN PULLEY COMPANY
Office and Works, Philadelphia, Pa.

Branches: NEW YORK, No. 203 Lafayette St. CHICAGO, No. 124 S. Clinton St. BOSTON, No. 165 Pearl St.



The Jackson Belt Lacer operated by one man laces a 20 inch belt in ten minutes, other widths in proportion. How long does it take in your shop? ¶ The Jackson Joint consists of intermeshing steel wire lacing, connected or disconnected in a second, by inserting or withdrawing a raw hide pin. ¶ It saves time and expense, not only because a splice can be made quickly, but because the connection is so neat and durable that the belt is not apt to break again at the same place and its life is thereby greatly lengthened. A Lacing made by the Jackson Belt Lacer is **equal to an endless belt.** ¶ Write for booklet.

BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY,
Birdsboro, Pennsylvania

CRESSON

POWER TRANSMITTING MACHINERY

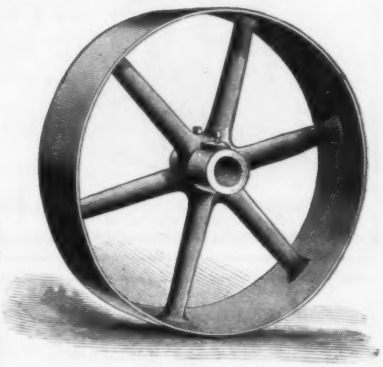
RING OILING HANGER
"PHILADELPHIA PATTERN"

Shafting Pulleys
Couplings Fly Wheels
Hangers Gears

Rope Driving a Specialty

Power Plants Designed and Equipped

Prices Right Shipments Prompt
Catalogs for the asking



CAST IRON
SOLID PULLEY

GEO. V. CRESSON CO.

ENGINEERS FOUNDERS MACHINISTS

PHILADELPHIA, PA., Allegheny Ave., West of 17th Street
NEW YORK CITY, 90 West Street

GANDY

THE
WATERPROOF BELT
THIS IS ONE ADVANTAGE OF
The Gandy Stitched Cotton Duck Belt

that's going to strike right home to you belt users who have had trouble with water-soaked belts.

One **Gandy** belt user running a 16 in. belt writes that he repeatedly finds it necessary to pump out of his wheel pit as much as three feet of water before starting up in the morning, and yet this Gandy belt has run for several years and even under these unfavorable conditions has given satisfaction.

This is only one of the advantages of the Gandy Belt.

It is the most economical and durable belt for Driving, Elevating and Conveying purposes. Besides costing less money (its first cost being only 1-3 that of leather belting and 25 per cent. less than that of rubber belting) it is not affected by oils, heat, steam or atmospheric changes.

Let us prove this to you. Send for our Booklet, "Experiences with The Gandy Belt."

Remember—there is only one Gandy Belt, and it is made by The Gandy Belting Company of Baltimore, Maryland.

Sign and return the coupon to us today.

The Gandy Belting Company
747 W. Pratt Street
Baltimore, Md.

New York Office
88-90 Reade Street

COUPON

Gentlemen: Replying to your ad. in Textile World Record, Apr.. send me free sample of Gandy Belting and booklet.

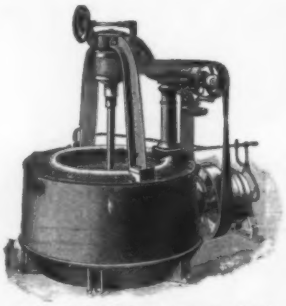
Name.....

Firm Name.....

Firm address.....

Where to be used.....

Hydro-Extractors, Exhaust Fans, Dye Tanks and Tubs

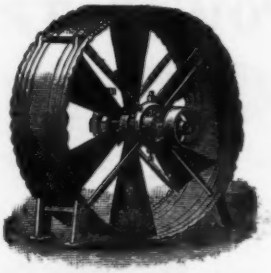


Adjusts itself to an uneven load, runs without vibration
Unusual capacity for high-class work

Bridger Hydraulic Cutting Press

Send for Catalog

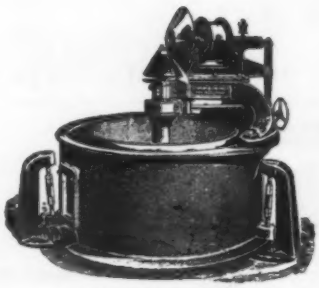
Tolhurst Machine Works
Fulton St. and 6th Ave., Troy, N. Y.



Moves more air than any other fan made. Very efficient under widely varying conditions. Noiseless and does not obstruct the light

SCHAUM & UHLINGER, Inc.

PHILADELPHIA



Machine "C" Belt Driven

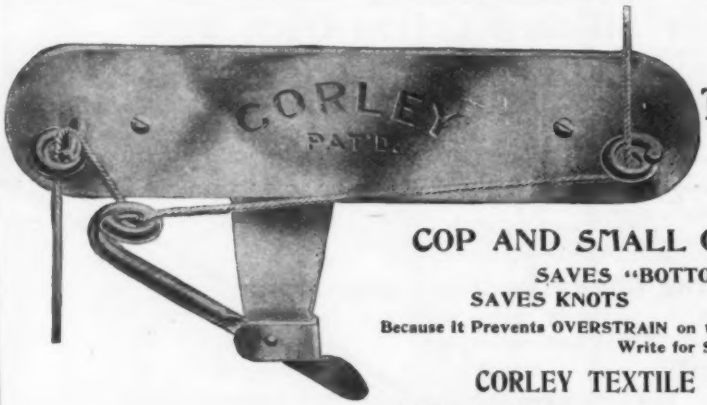
MANUFACTURERS OF

Self Balancing

Hydro Extractors

Electric, Engine and Belt Driven

Ask for Book Giving Full Particulars



CORLEY Tension Regulating Thread Guide

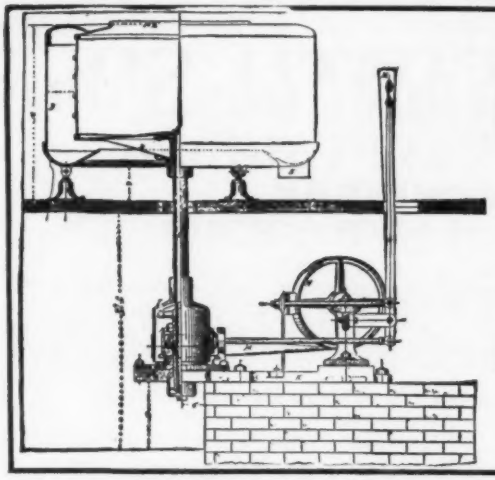
FOR

COP AND SMALL QUILL WINDING

SAVES "BOTTOM" WASTE
SAVES KNOTS SAVES CASES

Because it Prevents OVERSTRAIN on the Yarn and Makes Firmer Cones.
Write for Sample

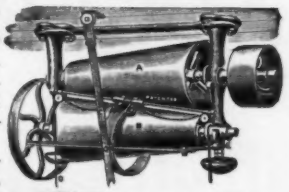
CORLEY TEXTILE SPECIALTY CO.,
Empire Building, - - - Atlanta, Ga.



WESTON
HYDRO EXTRACTORS
Special Machines for Acid Work.
also
SHAFTING, PULLEYS
FRICTION CLUTCHES, Etc.
Manufactured by
American Tool and Machine Co.
Founded 1845. Incorporated 1864.
109 Beach St., BOSTON, MASS.

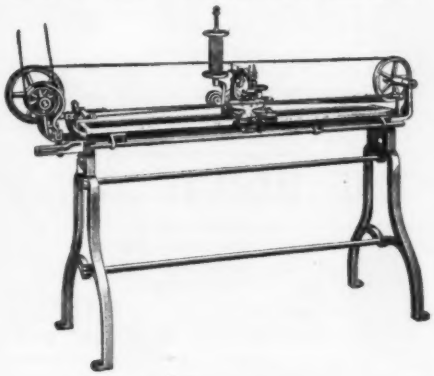
Diehl Manufacturing Co.,
ELIZABETHPORT, N. J.
HIGH GRADE
Electrical Apparatus
A line of Slow Speed Motors Especially Adapted to Textile Work

Variable Speed Countershafts
The Evans Friction Cone Pulleys will drive your machines at any desired speed from 1 to 6 by simply pulling a cord.
They are guaranteed to do your work.



We'll furnish them for either floor or hanging use.
Over Ten Thousand Sets in Operation in this Country and Europe.
Send for Catalogue
EVANS FRICTION CONE COMPANY
G. Frank Evans. Newton Center, Mass.

THIS MACHINE MAKES
PERFECTLY STRAIGHT SEAMS



No. 3 BELT-POWER
RAILWAY SEWING MACHINE

This Machine is like our No. 1 Machine, excepting that it is operated by belt power. This machine is a time and a waste saver, and a great help in various finishing processes.
The cloth is stretched on adju-table points and drawn out smooth to its full width. The sewing head moves across the machine, the cloth remains stationary until the seam is sewed, then the sewing head stops automatically.
In cloth rooms this machine is especially desirable to make long, continuous pieces.
It will sew cotton or woolen goods, thick or thin, wet or dry, and produce perfect work with unskilled labor.
Send for complete catalog of our sewing machines.

DINSMORE MANUFACTURING CO.
SALEM, MASS., U. S. A.

WM. FIRTH, Pres. EDWIN BARNES, Vice-Pres. JOHN H. NELSON, Treas.

WILLIAM FIRTH CO.

558-559 John Hancock Bldg., 200 Devonshire St., Boston, Mass.

SOLE IMPORTERS OF

ASA LEES & CO., Limited

TEXTILE MACHINERY

OF EVERY DESCRIPTION FOR COTTON, WOOLEN AND WORSTED.

Sole Agents for

JOSEPH STUBBS, Gassing, Winding and Reeling Machinery for Cotton, Worsted and Silk.
GEO. ORME & CO., Patent Hank Indicators, etc.
WILLIAM TATHAM & CO., Waste Machinery.
R. CENTNER FILS, Heddles.
GOODBRAND & CO., Yarn Testing Machinery, Wrap Reels, etc.
JOSHUA KERSHAW & SON., English Roller Skins, etc.
BUCKLEY & CROSSLEY, Spindles, Flyer and Pressers, etc.
GEORGE SMITH, Doffer Combs, etc.
BRADFORD STEEL PIN CO., Comber Pins.
SIR JAMES FARMER & SONS, LTD., Machinery for Bleachers, Dyers, Calico Printers and Finishers.
GEO. THOMAS & CO., Tachometers.

Also Agents for

JOSEPH SYKES BROS., Hardened and Tempered Steel Card Clothing for Cotton.
DRONSFIELD BROS., LTD., Emery Wheel Grinders, Emery Fillet and Flat Grinding Machines.
COTTON CORD & VELVET CUTTING MACHINE CO., Corduroy Cutting Machines, etc.

Pick Classes, Leather Aprons, Patent Wire Chain Aprons.

THE BIRCH COTTON FINISHING MACHINERY

Scutchers	Washing	Sewing
Angular Guides	Dyeing	Singeing
Conical Openers	Squeezing	Mangles
Stretchers	Folders	Engines
Open Soapers	Rollers	Napping

BIRCH BROTHERS

SOMERVILLE MACHINE WORKS — SOMERVILLE, MASS.

ALBERT BIRCH, Textile Mechanician — No Connection With Any Other Concern

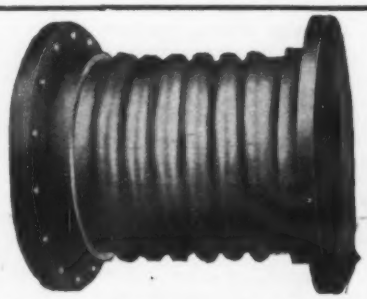
THE BIRCH WOOLEN WORSTED FINISHING MACHINERY

Crabbing	Steam Finishing	Cloth Openers
Piece Dyeing	Steam Blowing	Folders
Singeing	Sewing	Squeezing
Tentering	Tacking	Napping

BIRCH BROTHERS

SOMERVILLE MACHINE WORKS — SOMERVILLE, MASS.

ALBERT BIRCH, Textile Mechanician. — No Connection With Any Other Concern.



BADGER'S COPPER Expansion Joints

For exhaust and live steam

Guaranteed to take care of the expansion in lines of steam pipe. Made for all sizes of pipe.
Write for prices and full particulars.

E. B. Badger & Sons Co., 93-95 Pitts St., BOSTON, MASS.

Badger's Steam Jacket Mixing Kettles

WILLIAM FIRTH, Pres.

THE

FRANK B. COMINS, Vice-Pres. and Treas

American Moistening Company

120 FRANKLIN STREET, BOSTON, MASS.

Received the HIGHEST AWARD on recommendation of the FRANKLIN INSTITUTE for

"SIMPLICITY AND ORIGINALITY OF DESIGN."

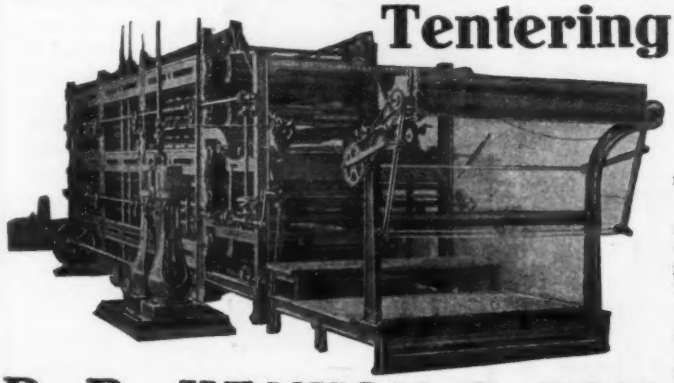
Is the largest manufacturer of HUMIDIFIERS in the world. The last twenty years receiving the HIGHEST AWARD in this country and Europe for its AIR-MOISTENING SYSTEM. EIGHT GOLD MEDALS and others.

The Only Perfect System of Air Moistening

Has Been Adopted by the Representative Manufacturers of this Country.
The only System adopted in the Textile Schools. Write for booklet "T" on Humidification.
Legal proceedings will at once be taken against infringers and users of infringements.

J. F. PORTER, Southern Representative, Room 209, Rhodes Building, Marietta St., ATLANTA, GA.

Tentering and Drying Machine



The cut represents one of our largest machines of the pipe system.

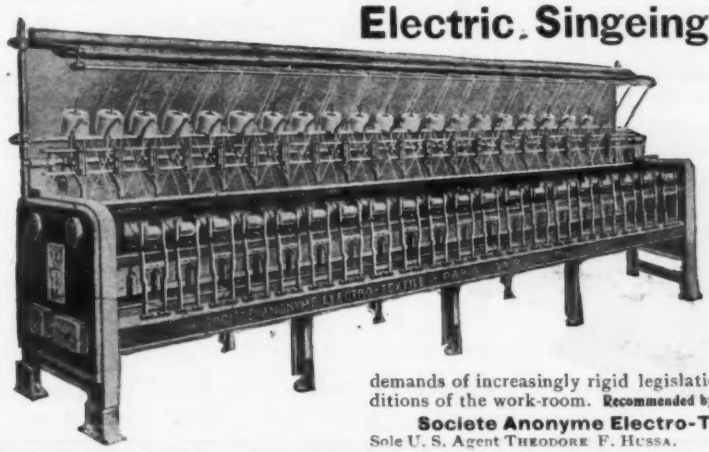
The wet goods in transit through the machine are thoroughly dried and tentered to the proper width. Although goods entering may be of various widths, all delivered are uniform.

The machine uses but a small amount of steam, and being substantially constructed, the repair bill is almost a negligent quantity.

It is equally efficient for heavy as well as light goods, either wide or narrow.

D. R. KENYON & SON
Raritan, New Jersey

Electric Singeing Machinery



for Cotton Yarns, Worsted, Silk Schappe, etc.

We lower your cost of production from 30 to 60%.

We produce yarns of finer quality.

We produce yarns of better color.

We give you cleaner, safer work-rooms.

Simple to operate.

The only machine that allows manufacturers to meet the demands of increasingly rigid legislation controlling the health conditions of the work-room. **Recommended by the Commissioners of Labor in France.**

Societe Anonyme Electro-Textile, Paris, France.
Sole U. S. Agent THEODORE F. HUSSA. 136 Liberty St., New York City.

Houghton's New Method of Weighting Top Rolls. A panacea for uneven yarn. Gives any desired weight on any roll. Free samples will be furnished on receipt of eight cents for postage. Send name of builder of frame when writing for sample. Descriptive circular on request.

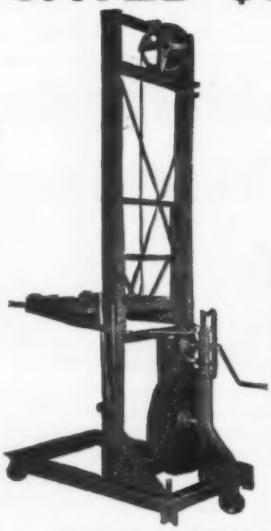
Houghton's Metal Thread Boards. Now used on one-fourth of all spindles in the U. S. A. 90 per cent. of new spindles are equipped with them. An unparalleled success. They advertise themselves.

Houghton's Metal Doffing Rail Spells Perfection. Automatically held in position for spinning or doffing. Can never get out of order. No bobbins split in holding up this rail for doffing.

Houghton's Hardened Thread Guides. In use seven years and still doing good work. No other guides as good, nor do they last as long.

L. T. HOUGHTON, Worcester, Mass.

SAVED $500.00



That's what you will say this time next year if you install one of our

Economy Steel Tiering Machines

ECONOMY ENGINEERING CO.
415 S. Washtenaw Ave., Chicago, Ill.
Parsons Trading Co., New York City
(Sole Foreign Agents)

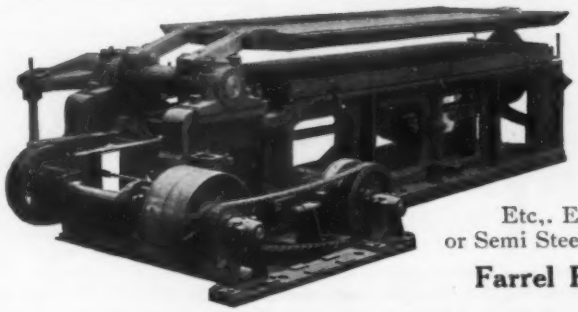
For Cramped Quarters

A REVOLVATOR operates in the narrowest aisle. It stacks on both sides and in the rear. Two men can do the work of five, and handle bales or rolls of cloth weighing 1,500 lbs. or more.

The **Revolving base** is the secret.

Send for our Textile Catalog W, stating height of ceilings and weight of bales and we will send prices.

N. Y. Revolving Portable Elevator Co.
349 Garfield Avenue
Jersey City, N. J.



Single and Double Felt Hardeners

Chilled and Soft Iron Rolls. Heavy Transmission Machinery. Machine Moulded and Machine Cut Gearing, to 20 ft. diameter, Etc,. Etc. Heavy Castings, in Gray Iron or Semi Steel.

Farrel Foundry and Machine Co.,
ANSONIA. CONN.

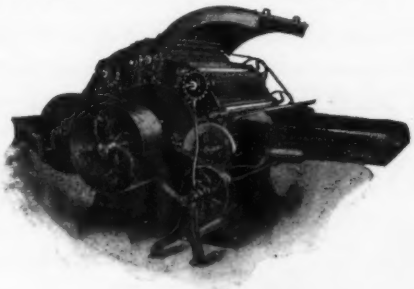
Birch Bros.
Somerville Machine Works
Somerville, Mass.

"Coronation" Piece End Sewing Machines

on American stand sent on trial most anywhere.
Send for circular.
Finishing Machinery.
ALBERT BIRCH,
Textile Mechanician

Sews any Fabric Thick or Thin, Wet or Dry Without Change. Fine Stitch or Coarse Stitch.

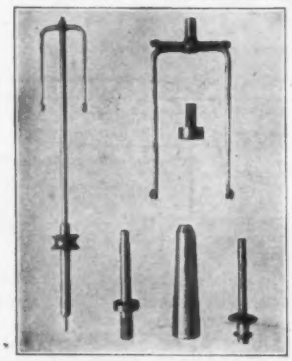
CURTIS & MARBLE MCH. CO.
WORCESTER, .. MASS.



FEARNAUGHT PICKER.

Wool Burring and Picking Machinery.
Cloth Finishing Machinery.

CALDER MACHINE WORKS

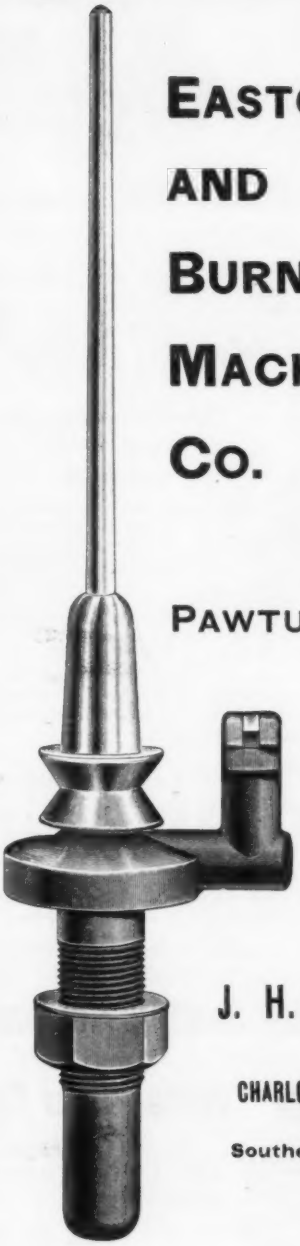


We Manufacture
Spindles
Flyers
Caps
Tubes
and all parts for Worsted and Silk Spinning.

Spindles and Flyers of every description promptly repaired.

420 North Third St., Phila. Pa.

SPINDLES



EASTON AND BURNHAM MACHINE CO.

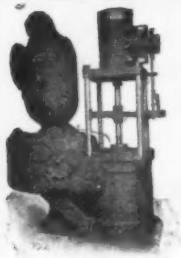
PAWTUCKET, R. I.

J. H. MAYES,
CHARLOTTE, N. C.
Southern Agent.

DEAN BROS. STEAM PUMP WORKS

INDIANAPOLIS, IND.

DUPLEX PUMPS, SIMPLE PUMPS
ATLANTIC BOILER FEEDERS
JET AND SURFACE **CONDENSERS** ELECTRIC PUMPS BELTED PUMPS, Etc.



VERTICAL AIR PUMP AND JET CONDENSER

DUPLEX DURABLE PUMP

SIMPLE PUMP

TWIN AIR PUMP AND CONDENSER

TRADE "BETTER THAN DAYLIGHT" MARK

COOPER HEWITT LAMP

The Difference Between Profit and Loss

In most lines of business is a simple matter of details. A little loss here, and a little loss there, and the profits are wiped out.

Poor lighting is one of the most common leaks, reducing the output of both machinery and man. The Cooper-Hewitt Lamp stops this leak. Experience has shown that **exactly the same efficiency of labor can be uniformly obtained under Cooper-Hewitt illumination as under the best daylight conditions.**

You had better think twice about this matter, —and then get in touch with our Illuminating Engineering Department for particulars.

Send for Catalogue 60

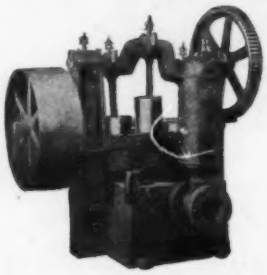
Cooper-Hewitt Electric Co.

Eighth and Grand Streets Hoboken, N. J.

Goulds Pumps

FOR EVERY SERVICE

Since Goulds Efficient Triplex Power Pumps were first placed on the market over a quarter of a century ago, they have given the utmost satisfaction wherever installed due to their



Efficiency
Durability
and
Excellent
Service

THE GOULDS MFG. CO.

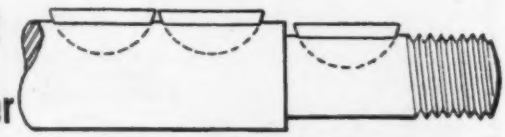
62 W. Fall Street, Seneca Falls, N. Y.

Branches in all large cities

Key Seating Attachment

FOR

Whiton Gear Cutter



We offer an attachment for use with our Gear Cutting Machine, to cut key seats for the Woodruff System of Keying. Write for description, circulars and price.

THE D. E. WHITON MACHINE CO.,

19 Oak Street, New London, Conn.

The Efficiency of an

Air Purifying, Cooling, Humidifying Apparatus

is determined by its SPRAY HEAD

The following important features in the **"Acme" System** Surpass all Other Designs

EFFECTIVENESS OF SPRAY

(1) Sprays form two sheets of water across chamber. (2) Water thrown in solid sheets or vaporized at will. (3) Complete saturation of the air—impossible during warm weather—insuring normal per cent. of humidity. (4) Nozzles distributed so that resistance to current of air is uniform throughout entire section of spray chamber.

1-4 inch Direct and Free Passage of Water through the Nozzle. Resistance to discharge of water a minimum. No pockets to retain dirt. Automatic flushing attachment. Material—brass—will not corrode. We guarantee an absolute humidity and temperature control. The ideal apparatus for TEXTILE MILLS.

Positive and easy method of flushing spray pipes.

Write for new 80 p. booklet.

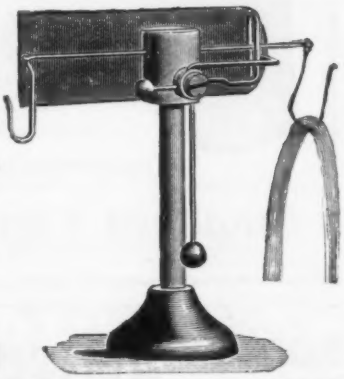
Thomas & Smith, Inc.

130 Carpenter St., Chicago 416 Broadway, New York

Spray Head in Operation.

"Thomas" Yarn Assorting Balance

For ascertaining from **very Short Lengths of Yarn** or **Small Bits of Cloth**, the Counts of Cotton, Woolen, Worsted, Linen or other Yarns. The number of Count, of any Yarn, coarse or fine, dyed, sized or in the grey, can be easily, rapidly and accurately found. Portable and handy; always ready; requires no adjusting, and has no loose weights. For English and Metrical Counts. Woodcut is 4-5ths actual size.



PRICE COMPLETE, with SET OF TEMPLETS (in Neat Case for the Pocket), $7.50

THE STANDARD THOMAS YARN BALANCE AS MADE AND SOLD BY US FOR OVER 20 YEARS

For Full Particulars of the above, also Tachometers or other Special Machines apply to

GEO. THOMAS & CO., Parsonage Lane DEANSGATE (60)

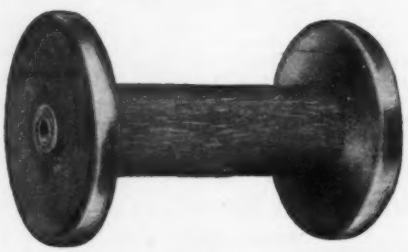
Telegraphic and Cable Address, "Samoht, Manchester" A B C Code Used National Telephone No. 1183 **Manchester, England**

HAVE YOU SEEN OUR

1910 **Diamond Finish**

WHITINSVILLE SPINNING RING CO.

WHITINSVILLE, MASS.



During 1910 nine times as many mills bought this Metal Protected Spool as did during 1909.

Almost every mill ordering a trial lot, has since ordered further quantities of this spool.

Doesn't this prove that it has made good?

Samples and prices upon application.

LESTERSHIRE SPOOL & MFG. CO., Lestershire, New York

"NO WASTE"

Seamless Hard Fibre Roving Can

The Only Can For Fine Spinners and the Very Best for All Grades of Work.

It does not have the riveted seam that strains and breaks the sliver.

NO SEAMS or RIVETS

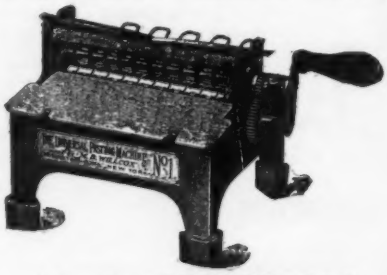
Absolutely Smooth

No Waste or Broken Ends

Write for prices. MANUFACTURED BY THE

Standard Fibre Co.
SOMERVILLE, MASS.

Keep Your Labels Clean



Use the "UNIVERSAL"

PASTING MACHINE

The adhesive is applied evenly and rapidly, without the slightest waste. The printed side of your labels are kept absolutely clean.

For applying labels to boxes packages or textiles in any form, you will find this machine most economical as a time and paste saver, and you may be sure that your

Goods Are Never Damaged.

Machines are made for power or hand operation.

No. 1 takes any label up to 5½ ins. wide, price, $10
No. 2 takes any label up to 8 ins. wide, price, 20

WILLCOX MFG. CO.
136 Liberty Street - New York, N. Y.

BLEACHING
DYEING
FINISHING
MACHINERY

ARLINGTON MACHINE WORKS

ARTHUR BIRCH
ARLINGTON HEIGHTS, MASS.

CRABBING
OPENING
SEWING
MACHINES

The Metallic Drawing Roll Co.

INDIAN ORCHARD, MASS.

MANUFACTURERS OF

Metallic Rolls

Especially adapted for Cotton Mills. 25 to 33 per cent more Production Guaranteed. Weight Reduced 33 to 50 per cent. No Leather Covering Bill.

WRITE FOR PARTICULARS.

The Vulcan Roving Can prevents broken ends

in roving by its smooth, glossy inside finish and true running on the card table. The body is made of the best chemically treated fiber which has many of the qualities of rawhide. All rivets are burred so they cannot draw out. Rings are made of steel and have rounded edges. Every can is accurate in size and perfectly round. They are built for long continued satisfactory service. Write for prices and list of users.

James Hill Manufacturing Co.,
PROVIDENCE, R. I

How Can I Get My Trade-Mark On My Goods?

By the Kaumagraph Process. It is the scientific, practical and economical method. **Absolutely uniform results** on **any fabric** guaranteed.

Send samples of your material and we will stamp them and return for your inspection.

Kaumagraph Company
110-114 West 32nd Street, New York

ESTABLISHED 1866 INCORPORATED 1888

Howard Bros. Mfg. Co.

Manufacturers of

CARD CLOTHING, Etc.

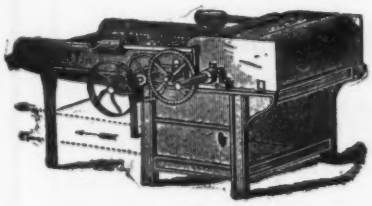
For COTTON, WOOLEN and WORSTED MILLS

"Quality is our Inducement"

44 and 46 VINE STREET, WORCESTER, MASS.

Geo. W. Gerry & Son, ATHOL, MASS.

MANUFACTURERS OF



Lumpers,

Wool and Waste Dusters,
Rag Dusters, Nappers.
Improved Cloth Measuring Machines.

Lumper and Duster Cylinders Refilled and Repaired.

Established 1870

John Heathcote & Son

Providence, R. I.

Builders of Improved

Cloth Tentering and Drying Machinery

for WOOLENS, WORSTEDS, FELTS, etc.

Built Upright or Horizontal with Low Down Feed

Ventilating Fans a Specialty

Send for Catalogue

¶ An intelligent answer to the query as to what constitutes suitable dyestuffs for any given line of fabrics turns upon one's conception of requirements.

¶ Two fabrics may be produced of equal quality throughout, except as regards the colors; if the one is fast and the other is not, is there any reasonable doubt as to which one will finally win out?

¶ The value of fast colors is far-reaching; there is the matter of reputation and of profit. Both are open to one who stands right with the ultimate consumer.

Alizarine Dyes
for Cotton and Wool

Synthetic Indigo
for Cotton and Wool

Indanthrene Dyes
for Cotton

BADISCHE COMPANY

NEW YORK BOSTON PROVIDENCE PHILADELPHIA
CHICAGO SAN FRANCISCO MONTREAL

COPYRIGHT 1909. LORD & NAGLE COMPANY. REG. U S PAT. OFF.

TEXTILE WORLD RECORD

Published on the 12th of each month by

LORD & NAGLE COMPANY

FRANK L. NAGLE, President. HENRY G. LORD, Treasurer.

SAMUEL S. DALE, Editor.

Publication and Editorial Office

144 Congress Street, Boston.

119 South 4th Street, Philadelphia. 123 Liberty Street, New York.
452 East 42nd Street, Chicago.

Entered at the Boston Post Office as Second Class Mail Matter.

Subscription Rates.

Textile World Record in United States and Mexico	$2.00 per year
To **Canada**, on account of extra postage	$2.50 per year
To other **Foreign Countries** (postage paid)	$3.00 per year
Textile World Record and the **Official American Textile Directory**, (Traveler's Edition),	$3.00 per year
To **Foreign Countries** with Directory (postage paid)	$4.00 per year
Dyer's Supplement	$1.00 per year

Remit by Express Order, Postal Money Order, Cheque or Registered Letter to Boston Office.

Copy for regular advertisements must reach publication office by the 25th of month preceding date of issue to insure proper attention. Transient ads., Wants, For Sale, etc., to go on Classified pages can be taken up to the 4th of the month of publication. We are always pleased to co-operate with advertisers in preparing attractive advertisements, and strongly recommend frequent change of copy, which increases the interest, and, therefore, the beneficial results of the advertising. We will cheerfully change copy as often as may be desired, providing it reaches us in time, but we cannot promise changes for next issue unless received as above stated.

Advertising rates on application.

Official American Textile Directory

Published annually, in two editions. Office, Large Size, **$3.00. Travelers'**, Flexible, Smaller, **$2.00.**

A Complete Directory of Cotton, Woolen, Knitting, Silk, Flax and Jute Mills of the United States, Canada and Mexico, together with the Dyeing and Finishing Works, Bleacheries, Print Works and other Textile Establishments; about 7,000 in all. Full information is given about each mill in almost every instance, viz., the name of the company or firm, names of officers, agent, superintendent, the character of goods made, the machinery equipment, i. e., the number of sets of cards (or combs), the number of spindles, number of looms; whether the mill uses steam or water power, whether there is a dye house or not, the names of the selling agents or if the mill sells direct. All this and much other information contained in this book is arranged in a way to be instantly accessible.

American Directory of the Knitting Trade.

Published Annually in a handy size for the pocket, $1.50.

It contains **full reports of every knitting mill** in the United States and Canada, giving capitalization, names of the officers, including superintendent and buyer; kind of goods made; number of knitting machines, whether latch or spring needle; number of sewing machines; whether the mill dyes or bleaches or finishes; kind of power; number employed; selling agent; kind of yarn bought; lists of the jobbers, manufacturers' selling agents, commission merchants, department stores and large retailers handling knit goods and the name of the person in charge of the knit goods department. List of dyers, bleachers, finishers, printers, etc., making a specialty of knit goods work. Special copyrighted maps of the mill districts, showing the cities and towns where there are knitting mills. It is indexed so any town or mill may be quickly found.

BALBRIGGAN

To get the correct Egyptian Shade, the shade that will insure uniform color throughout every roll, that is fast to light and washing, the large and small users employ

D AND M MACO EGYPTIAN TINT

on bleached bottom and

D AND M Egyptian Tints on unbleached bottom.

DANKER & MARSTON

BOSTON

Table of Contents for April.

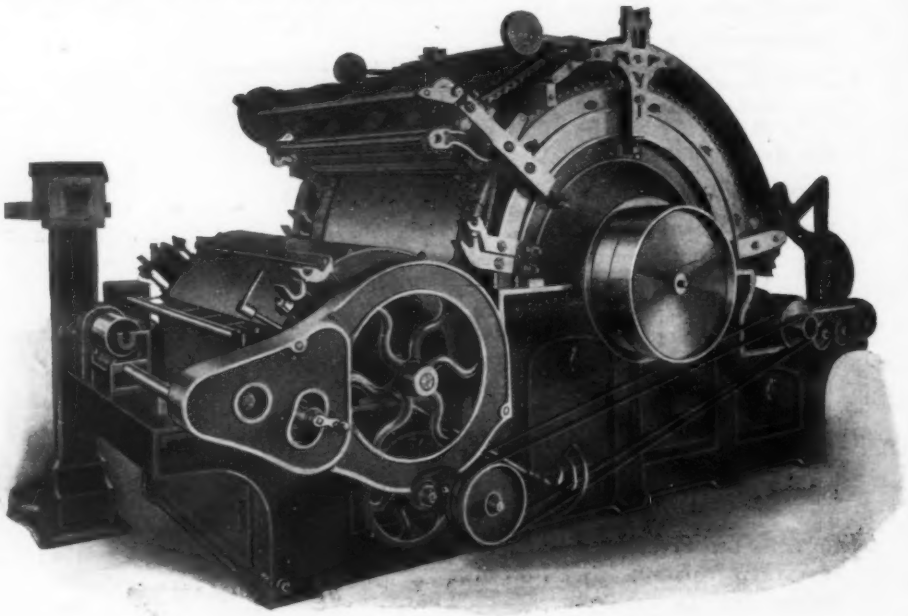
PAGE

Monthly Comment 67
The Silk Association of America 74
The Chemists' Building 74
A Textile Show in New York this Summer 75
Efficiency or Scientific Management 75
Wool Classing in Australia 78
Correspondence and Notes 83
French Worsted Spinning—Stitched Double Fabrics—Tests of Wood Perservatives—English Notes—Rollers and Roller Covering for Drawing and Spinning Worsted—Engine Speed Regulation in Textile Mills.
The Meeting of the National Association of Cotton Manufacturers. . . . 97
Questions and Answers 137
Knitting Department 143
The Knit Goods Situation—Knitted Neckties—Marking Yarn on Cops or Cones—Machine for Finishing Silk Neckties—The Hepworth Two-Thread Looper—Knitting Mill News.
Dyeing, Bleaching, Printing, Etc. 153
Special Tests for Fabrics—Faults and Defects in Cloth Finishing—A Rotary Dyeing Machine—Testing the Action of Light Upon Dyed Shades—Dye Recipes.
New Machinery and Processes. 163
Mill News 178
Personals 187
New Publications 193
Business Literature 193
Industrial Notes. 194
Recent Textile Patents. 200
Textile Trademarks Registered 200
Wool Market 233
Bradford Market 235
Cotton Market 237
Yarn Market 239
Rag and Shoddy Market. 247
Silk Market. 249
Dyestuffs and Chemicals 253
Mill Stocks 257

Correspondence

We solicit correspondence on textile subjects. Articles accepted will be paid for. Name and address must always be given, not necessarily for publication. Subscribers are invited to make free use of our Questions and Answers Department; correspondence is strictly confidential.

COTTON MACHINERY



PICKING MACHINERY
REVOLVING FLAT CARDS
DRAWING FRAMES (WITH ELECTRIC OR MECHANICAL STOP MOTIONS)
SLUBBING, INTERMEDIATE ROVING AND JACK FRAMES
NEW PATTERN SPINNING FRAMES
IMPROVED TWISTERS
CONE WINDERS, WARPERS AND SLASHERS

HOWARD & BULLOUGH
AMERICAN MACHINE CO., LTD.
PAWTUCKET, R. I.

CLB243314

TEXTILE WORLD RECORD

COMBINING

The Textile World and Textile Record.

VOL. 41 (NEW SERIES.) April, 1911 No. 1

Monthly Comment.

The Census of Woolen and Worsted Goods.

A preliminary report on woolen and worsted goods was issued by the United States Census Bureau on April 4. It applies only to those establishments making woolens and worsteds and does not include mills making carpets, felts, hats, knit goods, shoddy, nor dyeing and finishing works. The statistics for the censuses of 1899, 1904 and 1909 are as summarized as follows:

This statement shows that there have been some interesting and important changes in the character of materials used during the past decade. The quantity of wool consumed, in condition purchased, increased from 330,179,000 pounds to 474,751,000 pounds, or 44 per cent.; reckoned on a scoured-wool basis, the increase was 50 per cent. The quantity of raw cotton consumed decreased from 40,245,000 pounds to 20,055,000 pounds, or 50 per cent., while the amount of cotton yarn purchased increased from 35,343,000 pounds to 39,169,000 pounds, or 11 per cent. The net result is a decided decrease in the amount of cotton used as a material by wool manufacturers.

WOOLEN AND WORSTED GOODS—COMPARATIVE SUMMARY; 1909, 1904 and 1899.

	CENSUS—			Per cent. of increase 1899 to 1909
	1909	1904	1899	
Number of establishments	913	1,018	1,221	1 25
Capital	$415,465,000	$302,767,000	$256,554,000	62
Cost of materials used	273,466,000	197,489,000	148,087,000	85
Salaries and wages	79,214,000	61,433,000	50,126,000	58
Miscellaneous expenses	21,347,000	16,520,000	14,036,000	52
Value of products	419,826,000	307,942,000	238,745,000	76
Value added by manufacture (products less cost of materials)	146,360,000	110,453,000	90,658,000	61
Employees:				
Number of salaried officials and clerks	5,325	4,324	3,615	47
Average number of wage earners employed during the year	162,914	141,998	125,901	29

1 Decrease.

Attention is called to the decrease in the number of establishments and the increase in amount of capital, cost of materials, wages, value of products and number of employees, this indicating the pronounced tendency toward concentration. A comparative statement of the materials used is summarized as follows:

The figures also show a marked decrease in the use of shoddy. The quantity purchased decreased 35 per cent., and the amount manufactured in woolen mills for use therein fell off 10 per cent. In 1899 the total amount of shoddy consumed by woolen and worsted manufacturers was 68,663,000 pounds; in 1909 it was only 53,621,000 pounds, a decrease all the more significant when the growth of the industry is considered. This is explained by the fact that the manufacture of worsted fabrics, into which shoddy does not enter as a material to

any appreciable extent has increased enormously, while the quantity of woolen fabrics in which shoddy is utilized was actually less in 1909 than in 1899.

The quantity of tops purchased as materials increased from 5,566,000 to 20,828,000 pounds, or 274 per cent., and the quantity of worsted yarn from 25,111,000 to 58,769,000 pounds, or 134 per cent. These increases are due not only to the rapid growth of the worsted branch of the industry, but also to the greater degree of specialization which developed within that branch. Weavers of worsted fabrics usually purchase their yarn instead of spinning it themselves, and although worsted spinners usually comb their own wool, they are purchasing tops to an increasing extent.

There is also a table showing the quantity and value of the annual products of the mills from 1899 and 1909. The report calls attention to the increase in worsted products on the one hand and the decrease in carded woolen goods on the other:

The most notable features of this statement are the great increases in quantities and values of worsted fabrics, and the pronounced decreases in the quantities and values of many kinds of woolen fabrics produced. Of the all-wool goods, the value of woolen suitings and overcoatings increased 5 per cent., and woolen dress goods 26 per cent. Worsted suitings, on the other hand, increased 136 per cent. in value and 119 per cent. in quantity, and worsted dress goods, 231 per cent. in value and 83 per cent. in quantity, both showing a much higher value per square yard in 1909 than in 1899. All-wool flannels for underwear decreased both in quantity and in value, while all-wool blankets decreased slightly in quantity but gained in value.

Of the union or cotton-mixed goods produced, the value of men's wear fabrics decreased 39 per cent., and the value of women's dress goods, 52 per cent. Mixed cotton and wool blankets showed a gain of 154 per cent. in value.

Of goods woven on cotton warps, wool-filling suitings showed a slight increase in quantity but a decrease of 1 per cent. in value, denoting a drop in price per square yard—due possibly to the use of inferior materials in this class of goods. Worsted-filling suitings and overcoatings increased 111 per cent., and linings, Italian cloths, etc., which are worsted rather than woolen goods, gained 308 per cent. in value. Satinets, linseys, and cotton-warp blankets decreased both in quantity and value.

On the whole, the values per square yard of cloth manufactured were much higher in 1909 than in 1899; among the reasons for this may be given higher costs of production and an improvement in the general quality of goods made.

The relative amounts of woolen and worsted fabrics produced are more clearly brought out by combining the items of the above statement which fall in each of the two classes. In 1899, the number of square yards of worsted suitings, overcoatings and dress goods, worsted-filling suitings, overcoatings and dress goods, and linings, Italian cloths, etc., was 181,228,000, while in 1909 there were 350,659,000 square yards, an increase of 93 per cent. A combination of the remaining items shows 245,723,000 square yards of woolen cloths made in 1899, and 220,740,000 square yards in 1909, or a loss of 10 per cent.

Of the partially manufactured products made for sale, wool waste shows a gain of 185 per cent. in value over the 1899 figures. The large increase in quantity and value of noils produced for sale is another evidence of the growth of the worsted branch of the industry, and the large quantity of worsted yarn which enters the channels of trade is due to the fact that worsted spinning and weaving are not usually carried on under the same roof.

How It Works.

The immense growth of the textile industry during the ten years' period beginning with 1899 and ending with 1909 covers the period following the enactment of the Dingley Bill.

Not an insignificant portion of that growth of our textile industries in that decade is due to the establishment in the United States by foreign capital, of mills for the manufacture of products which had previously been imported, but which now are made here.

The following is an incomplete list embracing some of the more important of such concerns, involving the investment in the United States of upwards of $20,000,000 capital and giving employment to ten thousand operatives whose wages are spent in this country.

Stehli & Co. Established plant at Lancaster, Pa. Came from Switzerland. Have since started plants at High Point, North Carolina, and Paterson, New Jersey.

Rossie Velvet Co. Branch of main plant in Germany. Established plant at Mystic, Connecticut. New mill under construction at Willimantic, Connecticut. To be operated as branch.

Audiger & Meyer Silk Co., Paterson, New Jersey. Organized by German capital.

Duplan Silk Co. Established plant at Hazleton, Pennsylvania, with French capital and now have 1,000 looms operated on broad silks at Hazleton, and 150 looms on the same class of goods at West New York, New Jersey.

J. B. Martin Co., Norwich, Connecticut. Manufacturers of silk velvets. Established by French capital.

The Chn. Zimmerman & Son Co., Jersey City, New Jersey. Knit goods.

Lafayette Worsted Co., Woonsocket, Rhode Island, manufacturers of French worsted yarns. Belgian capital.

Gera Mills, Passaic, New Jersey, manufacturers worsted goods. German capital. A recent development is the building of a 10,000-spindle worsted yarn mill, now under construction, which will be known as the Passaic Worsted Spinning Co. It will make yarns for them.

Falls Yarn Mills, Woonsocket, Rhode Island.

Established by Joseph Cavedon, Italy, and T. Guerin.

Barre Wool Combing Co., South Barre, Massachusetts. English capital.

Muller Gloria Mills, Norwalk, Connecticut, manufacturers of silk umbrella cloths. German capital.

Joseph Benn & Sons, Greystone, Rhode Island. English capital.

Andrew's Mill Co., Inc., Philadelphia, Pennsylvania, manufacturers of woolen and worsted goods. French capital.

French Worsted Co., Woonsocket, Rhode Island. French capital.

J. & J. Cash, Ltd., So. Norwalk, Connecticut. English capital.

De Surmont Worsted Co., Woonsocket, Rhode Island. French capital.

American Viscose Co., Marcus Hook, Pennsylvania. Artificial silk plant. Branch of English concern.

Giron Bros. Co. (St. Etienne, France). Propose to establish a velvet plant in Connecticut.

Bradford Dyers' Association, Ltd., Bradford, England, are to establish $1,000,000 dyeing, bleaching and finishing plant at Niantic, Rhode Island.

New Jersey Worsted Spinning Co., Garfield, New Jersey.

Garfield Worsted Mills, Passaic, New Jersey.

Forstmann & Huffmann Co., Passaic, New Jersey.

Woonsocket Spinning Co., Woonsocket, Rhode Island.

The lace industry in the United States is comparatively new. It first began to grow ten years ago and received great impetus on the passage of the Payne-Aldrich Bill permitting lace machinery to be imported free of duty for a year. Lace machinery for certain kinds of laces largely imported is not made in the United States, and one of the largest items of our cotton imports has been laces and embroideries. In past issue of the Textile World Record we have pointed out the opportunities in this line of manufacture, which are now being realized.

Within the past eighteen months the following new lace manufacturing concerns have been organized, which will give employment to hundreds of skilled operatives and use thousands of pounds of cotton yarn:

Caderas & Ozanne, Pawtucket, R. I.

Dresden Lace Works, Norwalk, Conn.

Liberty Lace and Netting Works, New York City.

F. Binch & Co., Saratoga Springs, N. Y.

Regina Lace Corp., Central Falls, R. I.

Cadoza Lace Co., Pawtucket, R. I.

Seekonk Lace Co., Pawtucket, R. I.

Phoenix Lace Mills, Warwick, R. I.

Pioneer Lace Mfg. Co., Providence, R. I.

All these, except the Dresden Lace Works of Norwalk, Conn., and Caderas & Ozanne, Pawtucket, were started by American capital. The Dresden Lace Works is a branch of a German concern and Caderas & Ozanne is a French firm who moved their whole plant here.

The establishment of the cotton lace industry as a direct result of a favoring tariff is comparable to the establishment of the great tin plate industry by the McKinley Bill. While it may not grow to the same size it adds one more to the list of products which we will make for ourselves if permitted to do so.

Cotton Experts to Report on Trade Conditions Abroad.

R. M. Odell, an expert on cotton textiles of Concord, North Carolina, has been appointed Commercial Agent of the Department of Commerce and Labor to investigate trade conditions in foreign countries relative to the cotton industry. He will first visit Spain and Portugal, and will attend the meeting of the Eighth International Cotton Congress of the Master Spinners' and Manufacturers' Associations to be held in Barcelona in May next. His itinerary will include Northern Africa and later the Balkan States, and will be extended to other foreign countries. The cotton manufacturers of the United States will be fully advised of the results of his investigations through the Daily Consular and Trade Reports and bulletins of this Bureau.

J. M. Hause of Greensboro, North Carolina, who has had long experience as a buyer of cotton and a manufacturer of cotton goods, has also been appointed Commercial Agent and has been sent to England to study and report on the conditions in that country with respect to this important industry.

Manufacturers of cotton textiles and others interested in the cotton industry are invited to communicate with the Bureau of Manufactures in regard to any matters which they deem might be included in the investigations to be made by these cotton experts.

Durand C. Alexander, Jr., of New York

has been appointed Commercial Agent to investigate the export trade in machinery, machine tools, and other similar products in foreign countries. His first investigations will be made in the Orient, and his itinerary will probably include Japan, Philippines, China, India and the Straits Settlements and Australia.

Manufacturers who desire special matters investigated in these lines should communicate with the Bureau of Manufactures, and this Office will welcome any suggestions which might be covered by Mr. Alexander's investigations.

The Compulsory Working of Patents.

The government of India is preparing to follow England's example by making patents in India conditional on the inventions being worked in India. It is noticeable that the plan does not awaken in England the vociferous rejoicing with which the British compulsory working act was welcomed a few years ago. On the contrary, certain trades in Great Britain have worked themselves into a state of alarm over the prospect that India would adopt this British measure of protection to home industry. The explanation of these apparently conflicting views of the same measure is to be found in the different effects on British trade and industry. So long as British interests were to be benefited at the expense of Germany, the United States and other foreign countries, British merchants and manufacturers looked upon the compulsory working of patented inventions not only with complacency, but with unalloyed satisfaction. When, however, India decides to adopt compulsory working for the benefit of India at the possible expense of England the question immediately assumes a new aspect, and involved statements are issued to point out serious differences between identical propositions. The Indian Merchant's Chamber of Bombay was in some way induced to recommend to the Indian Government modifications of the proposed act calculated to make it less damaging to British interests. The Textile Mercury informs us that the Bombay Chamber is "an unimpeachably native and patriotic body," congratulates itself that it was "not left to Englishmen to point out" the arguments for the modifications, and then, it seems to us rather unnecessarily, lets the cat out of the bag by these words: "The members of the Indian Chamber are excellent customers of Lancashire, and in this matter they have played the part of friends indeed."

Wool Markets.

In the United States, Germany and some other countries there is a pronounced tendency to concentrate the business of selling wool in a few places where the trade for the entire country will be carried on within a small compass. The opposite tendency is found in France, where the growers have concluded that it is more advantageous to them to market their wool at smaller markets in the interior. In accordance with this idea a wool market for the Northeast of France has recently been established at Amiens, and another market located at Evreux. All sales are to be at auction, instead of privately as heretofore.

The Tariff Board Enlarged.

The bill providing for a permanent tariff board which passed the House and was passed in amended form by the Senate, failed to get through the House in its new form. The attempt to secure action during the closing hours of the session on March 4 was promptly met with a vigorous and general filibuster by the Democrats, who evidently had concluded the new-born zeal of the Republicans for a board to help the Democrats revise the tariff concealed a plan to embarrass the work of Democratic revision. Congress, however, provided an appropriation for the present board, and on motion of Senator Culberson a provision was adopted requiring the board to make a report on the schedule K to Congress by December 1, 1911. Disappointed by the failure to make the board permanent, President Taft immediately after the adjournment of Congress added two members to the present board, in order to make it as near as possible what the permanent board would have

been. The two new members are ex-Congressman William H. Howard, of Georgia, and Thomas W. Page, professor of political economy at the University of Virginia. Both are Democrats.

German Cotton Weavers for a Tariff Organization.

Occasionally reports come from Germany which indicate that the much vaunted German system of revising customs tariffs, like all other works of man, has its defects. The latest evidence to this effect is in the form of a letter to users of cotton yarn urging them to form a compact working organization which will represent the users of cotton yarn whenever tariffs are revised or trade treaties negotiated by the German government. The German weavers and knitters of cotton yarn have complained vigorously regarding the discrimination against them and in favor of the German cotton spinners under the present German tariff and the various trade agreements with other countries. They now propose to place themselves in a position where they can make their power effective when tariffs and commercial agreements are framed in the future.

Camel Hair.

The August, 1910, issue of this magazine contained a letter from our English correspondent on the production of and trade in camel hair, and the February, 1911, issue of the Bruenner Monatschrift fuer Textil-Industrie has the same letter translated into German and published in the form of an original article without giving any indication of the source from which it came. This is not right. It is unfair to our English correspondent, to the readers of the Bruenner Monatschrift, and to the Textile World Record. We do not know who is guilty of this literary piracy. It may be the editor of the Monatschrift, or some one who has translated our English letter and palmed it off on the Monatschrift as an original article. Regardless of who is the guilty person we hope the Bruenner Monatschrift will not permit a repetition of the incident.

The Easiest Way.

The confusion of weights and measures in the Philippines was recently recalled by the following extract from a letter we received from John Spirig & Co., Zamboanga, at the extreme southwestern point of Mindanao, Philippine Islands:

"It is with great interest that we read your different pamphlets on weights and measures. As simple and as desirable as the metric system for itself is, the introduction of same into the Philippine Islands only brought an additional confusion to the thousands of confusions we already have in this country. To make American measures and weights permissive in these Islands would of course simplify the trade greatly, not speaking of the unreasonable idea to give a colony a system of measures and weights (the metric) altogether strange to the homeland. All the products of this country are bought and sold by the "picul." Today almost every merchant has his own picul. One calls it 136 pounds; another, 141 pounds; and so on until it reaches in some localities the enormous weight of 154 pounds."

The unification of weights and measures in the Philippines is at present obstructed by the refusal of the authorities to choose the natural and not an arbitrary and artificial method of dealing with the problem. They are engaged in the impossible task of forcing on the Filipinos a system (the metric) which comes in conflict with established customs in the Philippines and with the natural operations of the human mind everywhere. Spanish weights and measures were introduced into the archipelago when the islands were acquired by the Spaniards in 1521. During the four hundred years since that time Spanish weights and measures have become the customary standards of the people, handed down from generation to generation, and fixed in the daily lives of the people by inveterate habit.

It was, of course, inevitable that these standards should vary in different parts of the archipelago, owing to the difficulty of communication, the character of the population, and the lax administration of the weights and measures department of the Spanish government. But today, as has been the case ever since the islands were discovered, the Spanish system of weights and measures is the Philippine system. In 1849 Spain made the metric system compulsory for

official business, but that system has not been adopted by the people to any important extent. About five years ago, on August 3, 1906, the Philippine Commission issued an order making the metric system the only legal system in the islands. Of course that act has had no more effect on the customs of the people than did the Spanish decree of 1849. We have repeatedly advised in these columns and in letters to the Bureau of Insular Affairs that the use of the English system be made legally permissive in the Philippines, as this was the method by which unification of weights and measures could be best attained. In reply to this suggestion the Chief of the Bureau on January 11, 1907, wrote as follows in defense of the metric act:

"With this state of affairs it was, of course, obviously necessary that some standard should be established, and in establishing it why not adopt one which would not only meet the local needs, but at the same time conform to the weights and measures used in foreign trade? Certainly it is possible that there will be some confusion, but will it be greater than that which exists with the present conglomerated system of weights and measures where the quantity contained in a picul, an arroba, or a tael is dependent upon the locality, which oftentimes is dependent upon another locality for a market where the quantity of a weight or measure is different?"

And the Governor General on February 15, 1909, made this reply:

"Why we should introduce into the Islands a new system (the English) almost wholly unknown,

WEIGHING BY THE SPANISH ARROBA (25½ ENGLISH POUNDS) ON THE MANILA DOCKS.

and add one more to the number of weights and measures already existing, is a bit difficult to understand."

These replies to our suggestions are based on a failure to recognize that the Spanish and English systems, not the metric, are predominant in the foreign trade of the Philippines, and that there is an identity between the English and Spanish systems, an identity so striking that they are more properly considered as but variations of one system. This is clearly shown by the following outline of Spanish weights and measures:

Spanish Weights.

16 ounces	1 pound
25 pounds	1 arroba
4 arrobas	1 hundred weight
5½ arrobas	1 picul

Spanish Measures of Capacity.

4 apatans	1 chuba
4 chubas	1 ganta
25 gantas	1 cavan

Spanish Measures of Length.

12 inches	1 foot
3 feet	1 vara
2 varas	1 braza

Spanish Measures of Area.

100 brazas	1 loan
10 loans	1 balita
10 balitas	1 quinon

Such is the framework of the fundamental system of weights and measures in the Philippines. It is for all practical purposes identical with the English system, this fact being so plain that it is useless to try to make it more so. A marked correspondence is also found in the size of the English and Spanish units of weight and area. The Spanish pound is equal to 101.4 English pounds, the same small difference being of course found between the Spanish and English ounces, quarters and hundredweights. When we come to area the square braza is equal to 30.08 square feet (English), this close approximation continuing in the loan (3008 square feet), the balita (30,080 square feet), the quinon (300,800 square feet), and the cavan (10,062 square feet).

Thus we find that the people of the Philippines and the United States are already using systems having the same general method of dividing the units, which in important respects are practically of the same size. The use of the English system in the Philippines would necessitate no serious changes. Free trade between the Philippines and the United States make the use of our weights and measures unavoidable in the archipelago. Natural selection is certain to bring the English system into extensive use, regardless of statute laws for or against it. The government can delay the progress of this development as it is now doing, or it can bow to the inevitable and hasten the unification of Philippine weights and measures by making the use of the English system permissive.

The New York Cotton Exchange.

At a meeting of the members of the New York Cotton Exchange last month the following resolutions looking to a reform of the methods of trading on that exchange were adopted:

Resolved, That it is the sense of this meeting that since the United States Government, through its Department of Commerce and Labor, has made an exhaustive investigation of the business methods of cotton exchanges and has criticised the methods and the by-laws of the New York Cotton Exchange in several material details, it will be good judgment on the part of this Exchange to carefully consider this criticism and, as far as possible, adopt the suggestions made by the Government, and, therefore, the board of managers be, and they are hereby, requested to formulate and bring before the members of the Cotton Exchange, in the usual manner, and at as early a date as possible, amendments to the by-laws to the following effect:

First, That the revision of the differences between the various grades above and below middling be made monthly, or at least there should be four or five revisions throughout the cotton year, and that such revisions, if made monthly, should preferably be made in the months of October, December, February, April or June, and, furthermore, that the committee on revisions shall adopt as their standard in making such revisions, which shall be mandatory, the average of the actual differences prevailing in ten to a dozen of the important Southern cotton exchanges or markets at the date of making the revision, and thus establish the difference in value of all grades on or off, as related to middling cotton, and embody in the by-laws the names of the selected markets;

Second, That the so-called pro forma bill, as it now stands in the by-laws, should be eliminated and, as was the original intention when the by-law was framed, the cotton should be permitted to be delivered on warehouse receipts, unaccompanied by a certificate, except during the last few days of the month;

Third, That the standardization of grades, as promulgated by the Government, should be adopted;

Fourth, That no cotton of a staple length of less than 11-16-inch should be classified and received on contract.

There has long been a reform party among the members of the New York Cotton Exchange, and this faction has increased rapidly in number and influence since the report by Herbert Knox Smith, Commissioner of the Bureau of Corporations, condemning the methods of this exchange, was issued. The favor with which the Scott anti-option bill was received in the last Congress, together with the prospect that the new Congress

would be even more disposed to adopt a correction measure, has still further strengthened the reformers on the exchange, and one result is the adoption of the above resolutions.

THE SILK ASSOCIATION OF AMERICA.

At a meeting of the board of managers of the Silk Association of America on March 30th the resignation of the secretary, Jacques Huber, was receiced and accepted, and the assistant secretary, Ramsay Peugnet, was appointed to fill the vacant position. Mr. Peugnet has filled the position as assistant secretary for two years and has shown such marked fitness for the work that the promotion as secretary came as a matter of course when Mr. Huber resigned. At the same meeting the following standing committees were appointed:

Arbitration Committee: John E. Cowdin, chairman; Div. A—Rioichiro Arai, Emanuel Gerli; B—Henry D. Klots, Vincent F. Wilcox; C—M. M. Belding, Jr.; D—Otto Andreae, Jr., Charles Cheney, B. Edmund David, Louis Stearns, Benjamin B. Tilt; E—John E. Cowdin, M. W. Dippel; G—Julius Kayser; H—C. L. Auger; I—Albert Blum, Theodore Boettger; J—Isaac A. Hall; K—Samuel Eiseman, Bernard Greeff, Sr., Thomas F. Vietor.

Complaint Committee: David Valentine, chairman; Edward E. Bradley, William Hand, B. A. Armstrong, R. von Briesen.

Committee on Admissions: Otto Andreal, Jr., chairman; H. D. Klots, Walter Kobbe, Emanuel Gerli, George A. Post.

Committee on Revenue Laws: Horace B. Cheney, chairman; Otto Andreae, Jr., B. Edmund David, Jacques Huber, Louis Stearns, H. Schniewind, Jr., A. W. Watson.

Reports from the various divisions of the silk industry are by no means discouraging in their tenor. The past year has not been especially fruitful as regards profit, but it is generally felt that the worst is left behind.

The following reports were passed upon at the meeting:

Div. A—Raw silks, R. von Briesen; B—Thrown silks, F. Q. Hartman; C—Sewing silks, Frank W. Eaton; D—Broad silks, D. George Dery; D—Tie silks, Adolph Hill; D—Piece dyed silks, R. J. F. Schwarzenbach; D—Fancies, Montgomery D. Rogers; E—Ribbons, John C. Welwood; G—Knit goods, Harry Taylor; H—Skein dyeing, Emil Geering; I—Piece dyeing, printing and finishing, Henry W. Boettger; K—Manufacturers' agents and commission houses, A. J. Quanz; Conditioning, Dr. Russell W. Moore.

Secretary Peugnet presented a report in which he made the following reference to the tariff:

"It is to be regretted that our legislators seem to favor a revision of the tariff. This is always a question of the gravest importance to every manufacturer in the country. After twelve years of protection under the Dingley tariff law, conditions had so changed that a revision of the tariff was generally acknowledged necessary. Insofar as schedule L (silk and silk goods) was concerned, the matter was given the most serious attention by the entire trade at the time of the enactment of the Payne Aldrich bill in August, 1909. The substitution of specific for ad valorem duties meets with the general approval of the trade, and both importers and manufacturers feel that the present tariff is framed on a satisfactory basis. The only result that is conceivable from a further revision of the silk schedule is the unsettling of business conditions. It is generally acknowledged that silk manufacturing interests in this country need all the protection it has under the Payne-Aldrich act. The silk schedule as it stands today is the result of the concentration of the best minds in the industry, and was recommended by our revenue laws committee only after expressions of opinion from all branches of the trade.

"With the election of a Congress evidently committed to revision downward and to revision 'piecemeal,' it is the duty of every silk manufacturer to bring all his influence to bear to preserve schedule L in its present form as nearly as possible. What revision 'piecemeal' means is hard to determine. If it means constant and frequent revisions as recommended by a permanent tariff commission it would be an assault upon the very bulwark of protection, as it is hard to think of anything that would bring about a greater lack of confidence. If, upon the other hand, it means a more thorough and scientific revision of each schedule, it might result eventually in permanent good. The silk schedule in the Payne-Aldrich tariff law provides no more protection than is necessary for the industry in this country to compete with foreign manufacturers, and for this reason there is little to fear from a revision conducted on thoroughly scientific lines."

THE CHEMISTS' BUILDING.

This building at 50-54 East 41st St., New York, which was opened on March 17th, is believed to be the first of its kind in the world. It combines the features of a first-class club, including restaurant and members' bedrooms, with finely equipped laboratories for analytical and consulting chemists and for investigators in pure and applied science, not to speak of a carefully planned scientific lecture-room, a large library and scientific museum. The chief tenant is the Chemists' Club, which occupies the lower half of the building. The ground floor is devoted to a public entrance hall, as well as to the general foyer of the Club, back of which is found the spacious lecture-room, whose lecture platform is fully equipped for chemical demon-

stration. The next story contains the social room and restaurant, and above this are the library, the museum and the trustees' room, and two floors devoted to bedrooms. The five laboratory floors are arranged in such a manner that each laboratory has light on at least two sides, and has its own ventilating ducts and mains for the supply of gas, water, electricity, steam, compressed air, and suction. The floors are fire, water and acid proof, and nothing has been omitted which is found in the best devised scientific laboratories of educational institutions.

A TEXTILE SHOW IN NEW YORK THIS SUMMER.

A textile exhibition is to be held in the Madison Square Garden, New York, during the month of August of this year. A company known as the National Textile Exposition, Inc., has secured the Garden for the week of August 5th to 12th.

The exhibition is designed to cover broadly all the different branches of the textile industry, including silk, cotton, wool. knit goods, carpets, laces, embroideries and upholstery fabrics of every description.

The men connected with the enterprise are C. H. Green, president; E. J. Rowe, vice-president and treasurer, and T. I. Skeoch, secretary and general manager. The latter gentleman was secretary and general manager of the Paterson exhibition held in November, in which the silk industry was largely represented.

The management is planning to show the processes of manufacture of different fabrics, woolen, cotton, knit goods and silk, from the raw material to the finished goods. They are negotiating with several prominent concerns in the different lines to install what would be a miniature mill in operation. In Paterson, where this plan was employed in connection with the silk industry, the builders of machinery furnished their latest type of machines, which were taken charge of by the manufacturer and a joint exhibition was thus made.

The management believes that with the vast number of people in New York and vicinity, together with the floating population and the summer traffic passing through in August, that there will be thousands that will welcome an opportunity to see how textile fabrics are made. It is the season of the year when the dry goods buyers from all over the country are in New York and this show is expected to be a practical demonstration to them of the processes of textile manufacture, as well as to show to the manufacturers and mill men the latest things in the machinery line.

It is under the auspices of experienced managers of such exhibitions and they have planned many features of interest and promise that the decorations and musical attractions will be of the highest standard.

EFFICIENCY OR SCIENTIFIC MANAGEMENT.

BY EUGENE SZEPESI.

(Copyrighted)

[The subject of industrial efficiency and scientific management is very much in the public eye at the present time. Some of the results accomplished in railroad and industrial work have been remarkable. One of the pioneers in this work, a man of wide reputation in connection with it, is Harrington Emerson Associated with him, and paying special attention to the textile industry, is Eugene Szepesi, a textile engineer of experience, who has become convinced of the great possibilities in this line and is putting them into practice.

We have arranged with Mr. Szepesi for a series of articles on this subject. The first appears in this issue, and is somewhat introductory. Later articles will deal more specifically with textile problems.]

During the period of the last twelve months we have heard the discussion of efficiency, or scientific management, from many sources. Industrial leaders, government officials, representatives of labor, and individuals almost in any undertaking, industrial or purely commercial, discuss this matter broadly; some of them with more, and some again with less success. It is very regrettable that the second largest industry in the United States, the textile industry, is among those that indicate but very little interest in this subject of utmost importance. In general, a misunderstanding or misinterpretation has been involved in the majority of cases when discussing efficiency or scientific management. Frequently it is put on an equal standing with the doubtful things, such as new systems of accountancy, gold brick mine schemes, and other undesirable propositions. To the benefit of everyone connected with the textile industry, let us explain the reasons, the principles, the history of efficiency, and why standard practice conditions or scientific

management should be applied to the textile industry as well as to any other industry.

Efficiency is a branch recognized in economics to denote the usefulness of any effort to produce wealth or service, either to individuals or to a community. It is as old as humanity itself. Historical successes and failures can be credited or charged to efficiency methods, under which such acts have been executed. The successes and failures of historical events, either political or commercial, were mainly dependent upon the efficiency talent of the ruler or leader. He may have been absolutely ignorant as to the principles and application, but he had natural talent to perform his duties with efficiency. We can ascribe the successful development of the human race to a mental efficiency. The super-animal skill and efficiency made it possible for the prehistoric human to struggle successfully during the many thousands of years in the past; to become the absolute ruler of our earth, and drive into his service every object created by nature.

The prehistoric man used his natural inclination for ruling, which he increased from time to time, according to his ability, and the requirements of circumstances. We have innumerable examples today to verify this philosophical statement. The savage of New Zealand or of the West Indian Islands may be considered as a direct descendant of the prehistoric man. They were immune to our civilization until almost as near as a century ago, and based upon the observations made by the first explorers and by the archæological researches, we can consider savages as the natural humans. Their costumes, their religion, their routine of every day life, their sorrow, their pleasures, are closely interwoven with the primitive struggles to secure existence. Their standard of skill, or their efficiency in obtaining the necessary means for existence, vary directly as the circumstances require.

The efficiency of the Malay for climbing a high tree is unobtainable by any other race. The Hottentot of the African Coast will excel any other race in the art of swimming and diving. The endurance for cold by the Eskimo seems wonderful to us. All these are the standards of their efficiency, required to maintain their existence. They have also standards for social and political efficiency. They have their own community. They have their rules and laws, which may seem barbaric by our standard, but still they serve the same purpose as ours.

These few examples should serve us as instructions for standardized conditions, from which we derive this law: A standard for any condition or any operation varies according to the requirements.

The modern recognized rule, to determine facts, from which a certain law or standard should be derived, is based, mainly, upon the observations of phenomena. These rules refer as well to physical as to political, social or economic phenomena. Newton made his first observations of the law of gravity when sitting under an apple tree. He took the simplified case of the phenomenon. Had he tried to observe this phenomenon on a cannon ball, which is moved by the kinetic force, and pulled downward by the gravity force, he would never have arrived at the point of recognizing the law and pronouncing the formula of gravity. The base of our modern languages, namely, the expression of thoughts by phonetical signs, could never have been evolved unless we tried and strained our minds to the use of symbolical language. This is also the case for efficiency or standardized conditions. Therefore, efficiency should be measured in standards laid down for highest efficiency by considering the facts.

We have excellent examples in the animal world for observing efficiency standards. The honey-bee, the ant, the opossum, and many other creations in the animal world can be considered millionaires in wealth, measuring them by our standards. The ant's storage of supplies, compared with the efficiency of human beings, is in the proportion of one to a thousand.

The Malay of today is a human on the lowest grade of civilization, but he is individually more efficient than the modern civilized human. Short of supplies of the necessities of life are almost unknown in the Malay community. Their wants are limited. Sometimes a short apron, many times a fig leaf, or more frequently, a broad smile, will

satisfy their desire for clothing. Nature offers an immense supply to maintain their physical existence; therefore, comparing the Malay with our civilized human, the former is one hundred per cent. more efficient than the latter in procuring the necessities of life.

Our research in the evolution of the human race makes us believe that it took a score of thousands of years before the simple invention of the carriage wheel struck the human mind. As a matter of fact, our Indians never knew of this invention before they were discovered by the white race; therefore, their standard for efficiency for transportation was the dragpoles, which was considered one hundred per cent. efficient.

We have numerous examples of these facts in the textile industry. The art of spinning is older than our ability would allow us to trace its origin in history, and we may rightly state that it could not develop before the human race reached the efficiency point of fully understanding the facilities and adaptability of the vegetable and animal fibers for the purpose intended.

As the human in the early stage of evolution had, most probably, his body covered with hair, therefore, it has taken many thousands of years before the human race arrived at the point of the necessity of clothing. The moral reasons for clothing were originated many thousands of years later. It was essential for this development that a physical degeneration should take place before they observed the necessity of protection against cold, rain and the piercing sun.

The soft crab, which is known to everybody, protects its soft and defenseless body against the hostile inhabitants of the high seas by carrying its body in an empty seashell for protection. Therefore, protection against injury is an animal instinct. Probably the human of a prehistoric age used the hides of other animals as the first means of physical protection. The standard was the hide, which was one hundred per cent. efficient to fulfill his requirements. It was a great improvement when he obtained sufficient skill and mental ability to use vegetable substances, rudely matted together, instead of the hides, which proved to be uncomfortable on hot days. Here, the standard was the vegetable matting, which served him with one hundred per cent. efficiency.

The first notion for a long and thin fiber resulted in splitting palm leaves into thin sections and joining the ends together. It was a wonderful development and resulted that the standard of efficiency for physical protection of the human race was increased again.

The primitive loom of the Hindoo, which remained practically unchanged through the score of thousands of years, may seem ridiculous to the modern traveler, but it should be regarded as a masterpiece of the human brain, as it took centuries to develop it. The arts of the Egyptians, of the Romans, and the present day savages show one hundred per cent. efficiency in skill. Different works of savage weaving arts, when compared, show absolute evenness in structure and design, and therefore highest efficiency for their community in these arts.

The history of wool dyeing has a mythological origin. According to the story a Greek shepherd was the discoverer of the art. His dog was hurt in a fight with a wolf and its master wiped off the blood with a bunch of wool taken from a sheep. The blood absorbed by the wool made the shepherd investigate, experiment and invent the art of dyeing wool, and raise the standard for efficiency of woolen apparel. Coming toward our modern civilization we find that it has taken almost twenty centuries before a radical change was introduced into the textile industry to raise the standard and efficiency.

Up to the flying shuttle, the invention of John Kay in the eighteenth century, the hand loom remained practically the same. Its efficiency was increased at that time through the flying shuttle to about fifty per cent., and therefore, the standard of efficiency has been raised to this practical production. Everyone of our big inventors during the industrial and mechanical development of the textile industry in the nineteenth century raised the standard automatically. This phenomenon coincides with the other laws of economics. The consequence of every industrial development is that the action of increased efficiency, increased standards, increased production, will be counteracted by the reaction of the

political conditions, stringency in raw material, and constant variations on the side of the demand. This phenomenon, which can be observed in every industry, with an almost mathematical correctness, is the basis of the presently discussed science of scientific management, or highest efficiency standards.

The first noteworthy work in this direction was done in Pittsburg by Mr. Taylor, and the work, taken up later on in general by Mr. Emerson and Mr. Gantt. The results obtained in other industries, among them such noteworthy examples as Harrington Emerson's work on the Santa Fe Railroad, should prove an ample demonstration that scientific management is applicable to any industrial or commercial undertaking, and therefore, that the textile industry cannot be an exception.

The purpose of any industrial undertaking is to produce wealth or to supply the demand of a certain community with certain necessities. The performance of such undertakings necessarily involve two main factors; one is capital, and the other is labor. The first factor, capital, incorporates actual money or a standard for exchange in procuring the necessary raw material and industrial necessities, such as machinery. The other factor, labor, furnishes the services of human beings essential for the intended production of wealth. The article to be made will necessitate raw material and the combined service of humans and machinery. The tasks of each can be determined to minute exactness; so can the time consumed for the different performances. The mechanical means of such performances, namely, of the machinery, is generally determined, and the period required for certain duties is known theoretically.

The object of scientific management is to deal justice to both main factors of wealth production. Its object is to determine under the prevailing standards the actual time, material and other factors needed for the production of one unit. Its purpose is to eliminate unnecessary and unjust sacrifices of materials and labor, and it succeeds in performing these tasks or to eliminate waste incurred during the performance of manufacturing to a very close figure under standard conditions.

(To be continued.)

WOOL CLASSING IN AUSTRALIA.

BY FIRE-BRAND.

From the Stock and Station Journal, Sydney.

(Continued from March.)

Apart from the fact that it is necessary to separate entirely from each other the different types or styles of wool that are used in each branch of the manufacturing industry, which it is well to remember are worsted and woolen, the greatest factor in the price per pound that is paid for wool is condition. By condition is meant the yolk or grease which all wool contains in a greater or less degree, together with more or less sand or earth. One of the greatest faults in present day classing is neglect or ignorance of this all important point, which will pay handsomely in results for any time and attention devoted to mastering it.

A buyer, when examining the sample bales exhibited for his inspection on the show floors of the wool warehouses, is fairly satisfied that such bales are generally representative of the wool he will find when he comes to sample the bulk of his purchases, and he sets to work accordingly. A wool buyer's life during the selling season being a most strenuous one, it will be readily understood that he strongly appreciates anything that will tend towards making his work a little easier and less complicated. Wool classing, when properly done, is of the greatest assistance in this direction. To make this clear, let us glance at his requirements, and the responsibilities entailed in fulfilling them.

He may be commissioned to purchase wools of combing type, or, on the other hand, he may be seeking fine clothing or super lambs, but whatever he is buying, his task is rendered easy or difficult, according to the "get up" of preparation for market of the wools on view. This is just where his risk appears, and his reputation is at stake, for generally he guarantees that the wool he buys is of a certain quality, and will yield so much per cent. clean scoured. If on reaching the mill the wool turns out disappointingly, or technically speaking, of under yield, the buyer is called upon to pay the differ-

ence. Now we can understand where condition comes in, and why the question of "clean yield" becomes of paramount importance and affects to such a degree the price per pound.

As an illustration of this point, let us suppose that a particular lot in a catalogue attracts a buyer's attention, and at first sight appears to be just what he needs to help fill some special order. He begins a closer examination, with the mental reservation that an extra farthing, or if need be, a halfpenny, will not prevent him from achieving ownership of this lot at all events. Having arrived at this satisfactory conclusion, he probes a little further into the sample bales, when his trained and sensitive fingers tell him that "condition" is not what he thought, and dipping further to the center of the bale he draws out a fleece, which, though all it should be as regards staple and quality, is anything but equal in condition to what he has already seen. Herein lies his difficulty. He has already made a mental estimate of yield, which is at once dispelled by the discovery of this fatty fleece.

It would be a simple matter for the buyer to say within one or two per cent. what each individual fleece will yield, and when all the fleeces in the bales are similar in condition what the lot will return in clean scoured wool; but when, as in this case, he cannot say what proportion of heavy conditioned wool is running through the clip, he is puzzled, and at once protects himself by reckoning on the greater part of the wool being heavy, and thus brings the value of the light wool down more nearly to the level of the heavy stuff.

From all this it must now be quite apparent how important a part the question of condition plays in the satisfactory realization of a clip of wool, and growers may be certain that irregularity in this respect means losing the probable extra halfpenny or penny per pound that their lighter wool would bring if it were packed separately. In evenly bred fleeces, the question of skirting, though important, is not "in it" with maintaining evenness of condition. The former can be dealt with more or less well at the mill. Besides, it does not so much affect the final cost of the wool before the operations of combing or carding; but no one has yet discovered a substitute for weight lost in the scouring bowl. As an old Yorkshire wool identity once remarked: "Thee gets nowt more from a catskin, laad, than catskin has to give."

In the course of preceding articles I have endeavored to present in a general way that can be easily understood, the reasons which make wool-classing desirable. As a matter of fact, before the fiber can be applied to its many and various uses in our domestic economy, classing or sorting becomes an absolute necessity. The very fact of the manufacturing industry being composed of two separate branches, using wools in each that are totally different to each other in length and quantity, and producing yarns and material the spinning and construction of which are entirely at variance in mechanical manipulation and finishing, should be sufficient inducement to wool growers to inquire more nearly into the matter as it concerns themselves.

To give a homely and practical illustration, let us suppose that a farmer sends potatoes and apples to market in the same package, does he expect to receive the competition of the best fruit or potato merchant? I think not, but his consignment will be bought at a low price by a smaller dealer, notwithstanding that both his products are prime in themselves. I can hear the farmer laugh at the foolishness of the above procedure, and he is probably justified, for I don't believe he would be guilty of an action so detrimental to his own interests, any more than he would consign wheat and corn to market in the same four-bushel bag. The farmers' wool is surely more valuable and will return him more money than any other product of his farm, and yet we find him year after year doing the apple and potato act with his annual clip, by packing merino and crossbred, long and short, heavy and light wools indiscriminately, in the same tare.

At this stage let me remark that I do not for a moment advocate over classing, or the splitting up of wools into a large number of small lots, which the selling brokers will perhaps lump together in the end. There are many instances on record of sales being spoilt in this way, owing to incompetence and lack of knowledge on the part of the person responsible for putting the wool together at the shearing shed. I wish here to impress upon wool growers generally, and the small sheep farmer especially, that if he will learn something regarding the ultimate destination of his wool and devote a little care and attention to its "get up" in accordance therewith, he will generally find that some buyer is prepared to pay a little more for it on this account, and so realize its full merited value.

Evenly classed, well marketed wools sometimes realize a fraction higher than is anticipated, which may be truly regarded as a premium paid for the care and attention bestowed upon them, which is always self-evident on a show floor. Such wools are always free selling lines and in times of depression are the least difficult to dispose of. The various districts of New South Wales all produce wools of different characteristics, and the world's wool buyers, as has been previously remarked, are keenly cognizant of this fact. The wool grower, too, if he wishes to get the most possible out of his clip, should get into the same position, and study the possibilities of wool production to the point of perfection in his own district.

In this connection I am glad to notice that the Government is now sending lecturers round the country districts. This indicates that the authorities are waking up to the fact that the educational aspect of the wool industry is worth considering in a wider sense than has hitherto been the case, and I hope soon to hear that the Minister for Agriculture has decided to engage a tip-top man in connection with the comprehensive future program of his own department. To come back to the main question: Besides the actual classing and grading of the staple into the several bins at the woolshed, the method of packing for transport in very many cases leaves much to be desired. Neglect in this matter, as in classing, is reflected back to the grower every time, and he is the sole loser. It will, therefore, be in his own interest entirely to remedy any faults in this direction.

A COMPARATIVE TRIAL BALANCE FOR A TEXTILE MILL.

BY SAGINAW.

(Continued from March.)

The office records showing all of the above requirements are of benefit, not only in making up the trial balance, but also for other purposes such as a fire loss, either partial or entire, as far as the mill is concerned. With full records covering the contents in every department to refer to a committee of adjusters will lose little time making guesses elsewhere.

The trial balance itself is contained on a single sheet as shown, and is supplemented by two auxiliary sheets which give the details of expenses and income. A convenient size is 8 1/2 by 11 inches, loose leaf.

The order of the accounts as before noted is of some importance. First come the assets, which are usually subdivided into fixed, investments, deferred and current; or technically expressed, they run from "fixed to liquid," starting with the goodwill account down to cash. The ledger should be arranged accordingly. Banks, when requesting a statement of condition from a client, usually reverse this order and ask for the liquid assets to be shown first, but their own books are not kept that way. Next come the liabilities as follows: "capital," "reserves" and "current and accrued." The object is so to group each side that the assets and liabilities will tend to show the relationship existing between each class of assets and liabilities. Auditors' reports will at times reverse the order of the liabilities leaving the "capital" last, but for trial balance purposes the method advocated above is preferable.

The asset accounts, as distinguished from the expense accounts similarly named and contained on the supplementary sheets, which cover the raw materials, such as

yarns, supplies and fuel, as also those prepaying interest or insurance, are invariably charged when the materials bought are put through the books or when insurance premiums or interest on loans amounts are advanced. The corresponding expense accounts are not disturbed until taken care of corresponding expense accounts, thus always leaving the asset accounts with a balance which should show the approximate value of stock on hand at balance time.

To refer to the example, the first column in the expense accounts on sheet A, first line, shows that $18,000 worth of yarns was

SHEET B

EXPENSE ACCTS Continued	No. 1 Month ending Jan 31/11	No. 1 Month ending Jan 31/10	5 Months ending Jan 31/11	5 Months ending Jan 31/10
SELLING EXPENSE				
75 Salaries Traveling etc or				
76 Commission & Guarantee				
TOTAL	$ 2,000 00	$ 2,200 00	$ 9,000 00	$ 9,300 00
GENERAL EXPENSE				
77 Officers Salaries	600 00	600 00	3000 00	3.000 00
78 Legal	50 00	- -	200 00	- -
79 Sundry, including Travel, Freight out, Interest, Claims etc.	550 00	500 00	2300 00	2.090 00
TOTAL	$ 1,200 00	$ 1,100 00	$ 5500 00	$ 5090 00
RECAPITULATION of EXPENSE ACCOUNTS				
Raw Materials & Dyeing (from Sheet A)	19.000 00	18200 00	70000 00	70 600 00
Mill Expense	7425 00	7720 00	28630 00	29 110 00
Main Office Expense	400 00	380 00	1870 00	1.900 00
Selling Expense (see Above)	2.000 00	2200 00	9 000 00	9 300 00
General	1300 00	1100 00	5500 00	5.090 00
TRANSFERRED to BAL SHEET	$ 30,725 00	$ 29 600 00	$ 115.000 00	$ 116.000 00
(Columns 3 & 4 only)			↔	↔
(" 1 & 2 show single Month) not Transferred				
STOCK ADJUSTMENT ACCTS				
80 Process Goods	$ 1,000 00	$ 500 00	$ 1500 00	$ 500 00
81 Finished	1 3500 00	$ 300 00	$ 1000 00	$ 1.000 00
			↔	↔
INCOME ACCOUNTS				
82 Sales	35000 00	30 500 00	126.500 00	127850 00
83 " Cash	200 00	150 00	500 00	780 00
84 " Waste etc	- -	150 00		220 00
85 Discounts on Purchases	50 00	700 00	250 00	300 00
86 Interest earned	150 00	180 00	750 00	650 00
87 etc				
TOTALS Marked ⇔ Transferred to Bal	$ 35,400 00	$ 31,050 00	$ 128 000 00	$ 129800 00
			↔	↔
TENTATIVE PROFIT & LOSS STATEMENT				
First 2 Columns for Single Month				
Income as above	35.400 00	31,050 00	128 000 00	129 800 00
Expense	30.725 00	29.600 00	115 000 00	116 000 00
Difference	4.675 00	1450 00	13 000 00	13 800 00
Stock Adjustment Accts as above	2500 00	800 00	500 00	1500 00
Black figs show Profit. Red figs Loss	$ 2175 00	$ 2250 00	$ 13 500 00	$ 12 300 00
	⇔	⇔	⇔	⇔
PRODUCTION REPORT				
Nt of Yards of Cloth Made				

by journal entries at the end of the month. Assuming that $1,000 worth of yarns are received on January 3, account No. 9 is charged, and not account No. 50. So also with fuel and supplies bought during the course of the month. On January 31 a journal entry or voucher is made crediting these asset accounts with the amount actually used during January and debiting the used during January. This figure represents the journal entry for the month as posted to the ledger account. Along the same line, in column three, appears the amount $67,000, which is the successively journalized amounts estimated for the five months ended January 31 as obtained from the yarn stock book each month.

Finished goods are figured to ascertain

their value and the asset account No. 14 is credited with the estimated inventory from the piece goods stock books. If the new inventory is larger than the old one there will remain a credit difference, or balance, which must be journalized to debit the "Finished Goods" asset account No. 14 and credit a "Finished Goods Stock Adjustment" account No. 81. These new inventory figures, just credited to the asset account as above indicated, are now brought down to the debit of the same account as when the books are closed after stock-taking at the end of the fiscal year. If on the other hand, the new inventory is smaller there will be a debit to transfer to the adjustment account in the same manner, the new inventory figures being also brought down as before.

Process goods are likewise cared for as above. A list is prepared embodying the warps dressed and on the floor; those being drawn in; the ones in the looms and the pieces in the grease and on the finishing room floor, as shown by the finishing room book. Averaging the value of these warps and pieces will generally, but not always, result in bringing the figures thus obtained within the 10 per cent. error limit if carefully planned and performed. The error, if greater, will not be sufficient to render the results valueless even if 15 per cent. out of the way, inasmuch as the process goods rarely represent more than 25 per cent. of the total estimated inventory to be made. A more elaborate and detailed listing and pricing is, of course, better but not necessary. The method of valuation must, as is self evident, follow the system pursued at stock-taking time in so far as the apportionment of burden or overhead charges is concerned. The writer has seen piece goods in the grease valued at their bare yarn plus labor value, whereas allowance should naturally be made for the overhead charges which have accumulated during the partial manufacture of the goods.

The amount, when determined, is journalized in the same manner as the finished goods account, the difference between the old and new inventories in this case being carried to the "Process Goods Stock Adjustment" account No. 80, and the new inventory figures brought down to the debit of the process goods asset account.

Depreciation allowances are to be credited to the buildings, plant and fixtures asset accounts to the respective expense accounts according to the department to which they belong. Mill maintenance, account No. 68, for instance, will take care of the plant and machinery charges for depreciation.

The journal entries having all been made and the ledger accounts balanced, it remains to transfer the balances to the condensed balance sheet within columns 1 and 3, and then to sheets, A and B, within column 3 only. The balance sheet alone contains debit and credit columns; sheets, A and B, do not because all the expense accounts are usually debits and the income accounts credits. Should it happen that an expense account show a credit balance, or an income account show a debit, such unusual or casual balances would be written in red ink, and the red ink totals subtracted from the black for the "Total." On the other hand the stock adjustment columns on sheet, B, are shown with black figures for a credit balance and red figures for a debit. A loss for the month is also written in red, when appearing on sheet, B. In the example shown it is assumed that January is the fifth month since the last closing of the books, although this is not usually the case, the fifth month ending more frequently on December 31, where the ledgers are closed with each season's end.

(To be continued.)

THE NATIONAL ASSOCIATION OF WOOLEN AND WORSTED OVERSEERS.

The twenty-ninth semi-annual meeting of this association will be held at Crescent Park, Providence, R. I., on Saturday, May 20th. The arrangements are being made by the committee appointed at the last meeting of the association. These gatherings are enjoyable and profitable and a large attendance is expected.

Correspondence and Notes

UPON TEXTILE TOPICS AT HOME AND ABROAD

FRENCH WORSTED SPINNING.

BY ROBERT DANTZER.

(Translated from the French by the Editor of the Textile World Record.)

GILLING.

The slivers coming from the card are delivered to the gill box in pairs in order to obtain a heavier and stronger sliver, capable of resisting the strain in the subsequent processes. The sheet of wool is detached from the doffer by the oscillating comb which has a tendency to roll and curl the fibers, giving them a mixed appearance as if felted. As a result gilling, which is the first process to which the wool is subjected after coming from the card, has for its object to bring the fibers parallel. It also serves to reduce the waste in the process of combing. During the gilling process the sliver is also subjected to the doubling and drawing process. The term "doubling" refers to the number of slivers fed to the machine and combined into one sliver. The term "drawing" refers to the process of drawing the sliver finer by running it through two sets of rolls, of which the second set is run at a higher speed than the first.

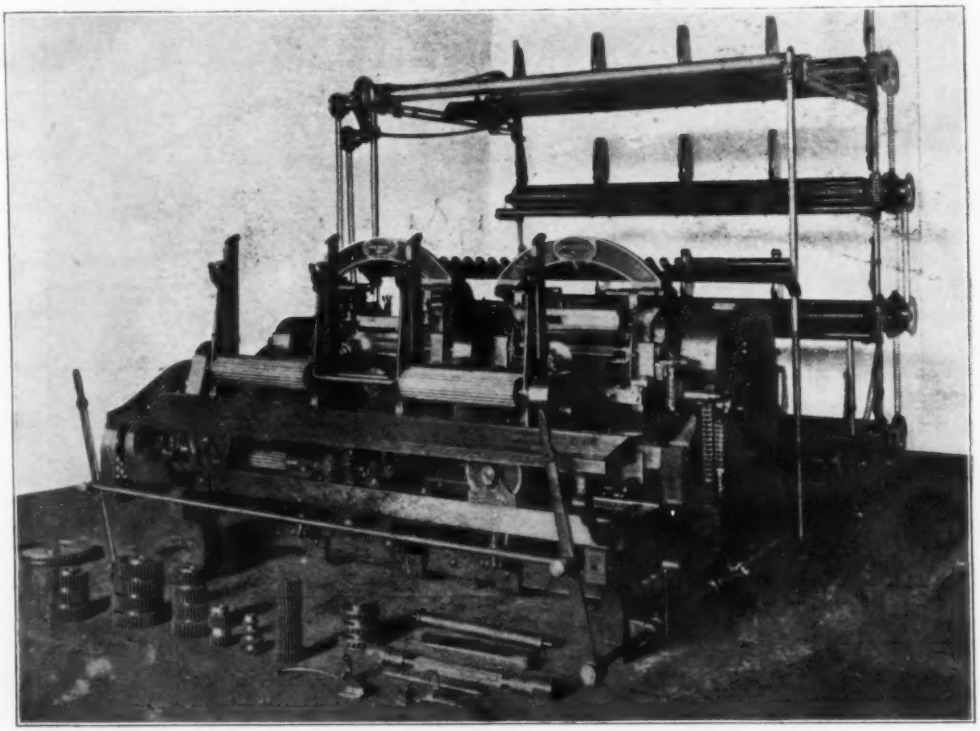


FIG. 1. A LEADING TYPE OF INTERSECTING GILL BOX

Figs. 1 and 2 show the two leading types of gill boxes used at this stage of the French spinning process. This machine is in every respect the same as that used after the combing process. In order to avoid repetition, I

will postpone a description of the mechanism until later. The gill box shown at Fig. 3 has two heads and illustrates a special method of applying the pressure on the front rolls. Fig. 1 is known as the intersecting gill box; Fig. 2 is the circular type, while Fig. 3 is a faller gill box. Usually six slivers are fed to the gill box and combined into one. As these slivers have previously been doubled it is necessary to set only three rolls in the rack of the gill box. The draft usually varies from 2 to 3. With a draft of 2, the resulting sliver will be three times the size of the card sliver, and in the latter case it will be double the size. This increase in the size makes the ribbon better suited to stand the strain of the succeeding operations.

In the gill box shown at Fig. 1, the card bowls are set on the horizontal, corrugated rollers which are driven by the chains as shown. This box is called a two-head gill box because it delivers two strands. The box shown at Fig. 2 is a four-head gill box. After coming from this first box the gilled sliver is run through the backwasher, which also has a gill box attached, so that the material is gilled twice.

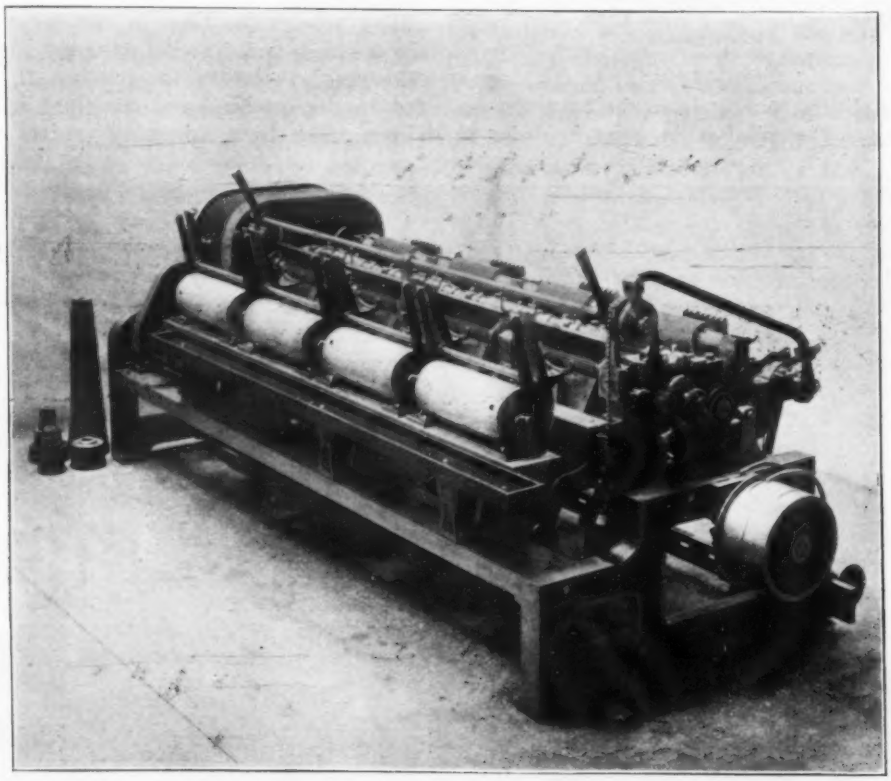


FIG. 2. THE CIRCULAR TYPE OF GILL BOX

A set of French spinning machinery consists of a series of successive machines through which the material is run during the process of manufacturing into roving. The layout of the set consists in the combination of successive doublings and drawings. As will readily be seen, the size and speed of the machines must be determined by calculation in order that each may supply the succeeding machine with material without interruption of the process. As the wool fibres are of various lengths three models for the layout of French worsted machinery are employed:

Coarse wool..... 8 in. to 14 in. long
Crossbred wool... 4 in. to 9 in. long
Merino wool.....1½ in. to 5 in. long

The wool of each class is in turn classified according to whether it is fitted for warp or filling. The long and medium wools are preferably handled on English combs. The short wools are combed on the French combs of the Heilmann type (Schlumberger-Delette, Offermann), this constituting the distinctively "French system" of combing. While the French combs can handle either long or short wools, the English combs are suited only for the longer wools. The operations from sorting to gilling, to which the wool is subjected before the combing process is reached, are the same for both the French and Bradford systems of worsted manufacturing. With the French system the card sliver after the first gilling is run through the backwashing machine.

Backwashing gives a lustrous finish to the sliver which, however, is lost during the French system of combing. Backwashing has two objects: (a) to impart a certain lustre to the wool; (b) to remove the oil applied to the wool before carding. As already stated, the lustre is retained only in the Bradford system, so that in the French system the only object of backwashing is to remove the oil. Backwashing facilitates the removal of dirt and bunches during the combing process. Backwashing consists in immersing the slivers in a solution which removes the oil. It is then dried so as to retain 17 to 18 per cent. of moisture. In most cases

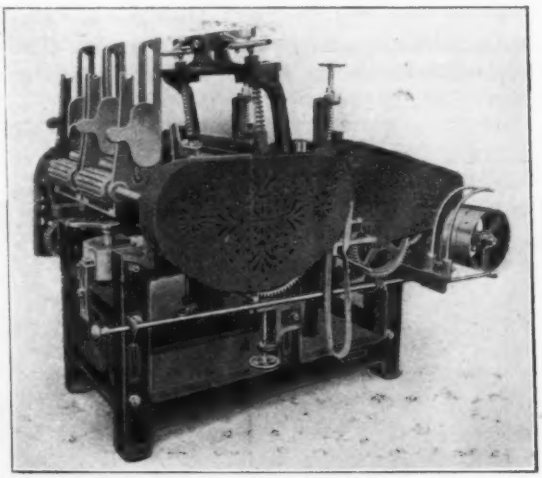


FIG. 3. A FALLER GILL BOX

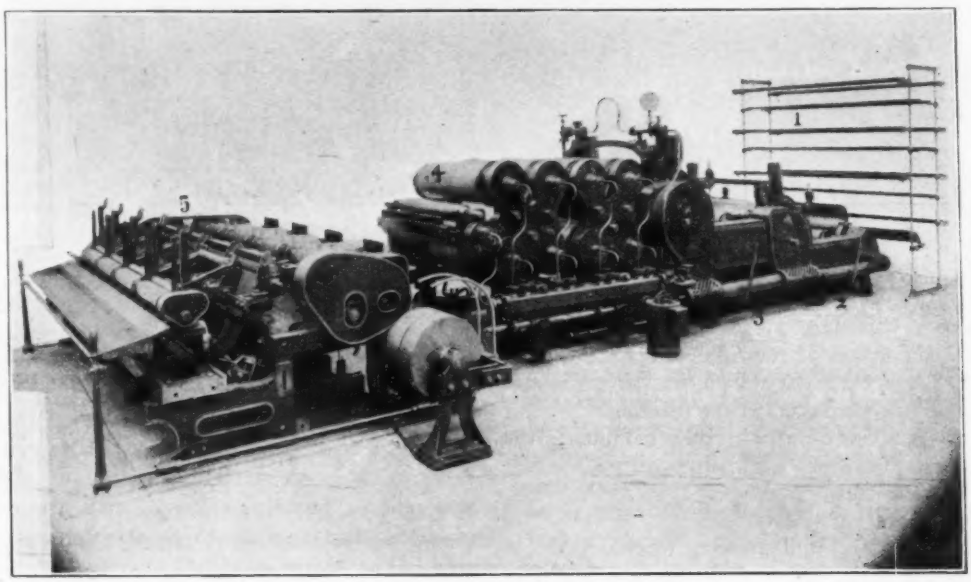


FIG. 4. VIEW OF A BACKWASHER

the backwasher consists of two bowls, each having a pair of rolls, the lower roller running in the solution and the upper roll serving as a press roll to squeeze the surplus liquor from the material. Machines are also made having a larger number of bowls. The solution is similar to that used in scouring.

cular form. The feed rack is shown at Fig. 4. The bowls holding the solution are indicated by 2 and 3. The drying apparatus, 4, consists of a series of copper cylinders heated by steam. The gill box is shown at 5.

Backwashers may be divided into two classes, according to the method of drying

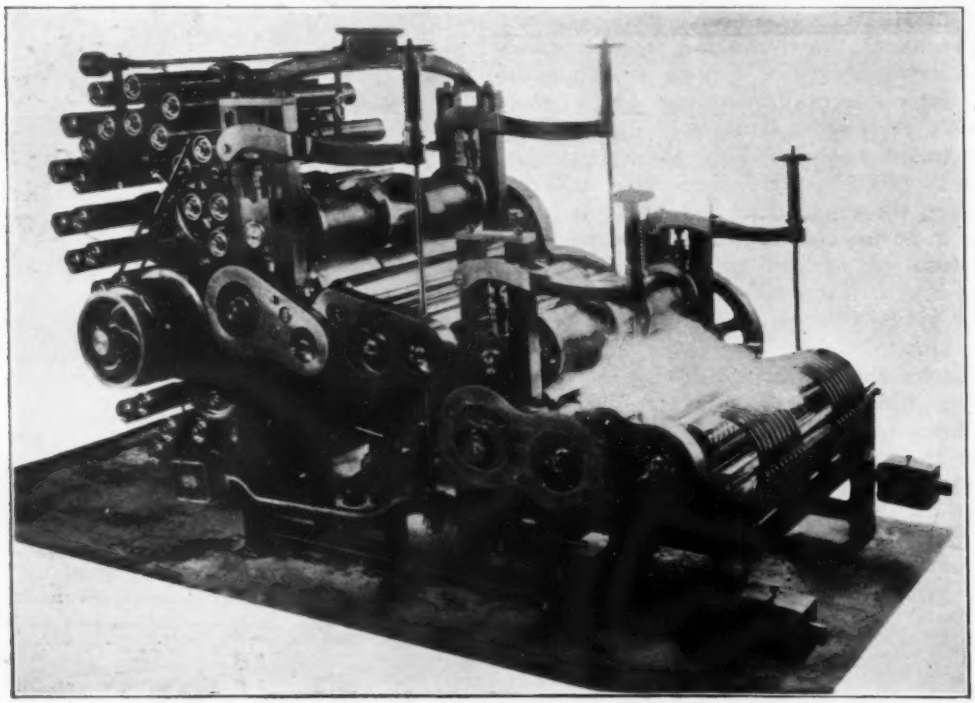


FIG. 5. ANOTHER TYPE OF BACKWASHER

Marseilles soap is extensively used as it imparts a soft feel to the wool. The backwasher consists of the following parts:

1. A rack from which the sliver is unwound and delivered to the machine.
2. A series of 2 to 5 bowls containing the dissolving solution, each equipped with a pair of squeeze rolls.
3. A drying system.
4. A gilling and drawing mechanism.

As the sliver comes from the gill box it is wound on a bobbin. Fig. 4 is a view of a backwasher. The various types of this machine differ principally in the method of drying, the gill boxes generally being of the cir-

employed: (a) drying by contact; (b) drying by hot air. Fig. 4 belongs to the first named class. The slivers of wool, after coming from the squeeze rolls, pass over the copper cylinders, 4, which are speeded so as to avoid a tension on the sliver. These cylinders are built to stand a pressure of eight atmospheres, but it is seldom that a pressure of more than two or three atmospheres is used. The steam is supplied to the interior of the cylinder through the bearing on one end, the water after condensation escaping from a drip at the other end. Each cylinder is provided with a safety valve, in which the

steam is allowed to escape when the pressure rises above three atmospheres.

The backwasher shown at Fig. 5 belongs to the same type, but the eight drying cylinders are replaced by 62 copper tubes of a much smaller diameter. These tubes are driven by gears at one end, as shown in the illustration. The other end of the tube is free, permitting the slivers to be easily placed in position. Each of these tubes is mounted on another tube which is heated by steam. This type of backwasher is also built with five bowls for working dyed or printed sliver. There are various objections to drying by contact with steam heated cylinders. A large amount of steam is consumed and the production decreases materially when the water accumulates in the cylinders or pipes. Furthermore, there is danger of explosion. The damp wool under the influence of heat and pressure becomes felted, and if the machine is stopped there is danger of straining the wool and reducing its market value. The March issue of the Textile World Record contained a description of backwashers equipped with hot air drying apparatus. Fig. 6 shows a hot air drying backwasher built by Boldy & Son, Bradford, Eng., and for which Speed & Stephenson, 170 Summer street, Boston, are the American agents. The perforated and corrugated brass cylinder is charged with hot air from a fan blowing through a steam-heated chamber behind the machine. The hot air finds an outlet through the perforations and then through the sliver.

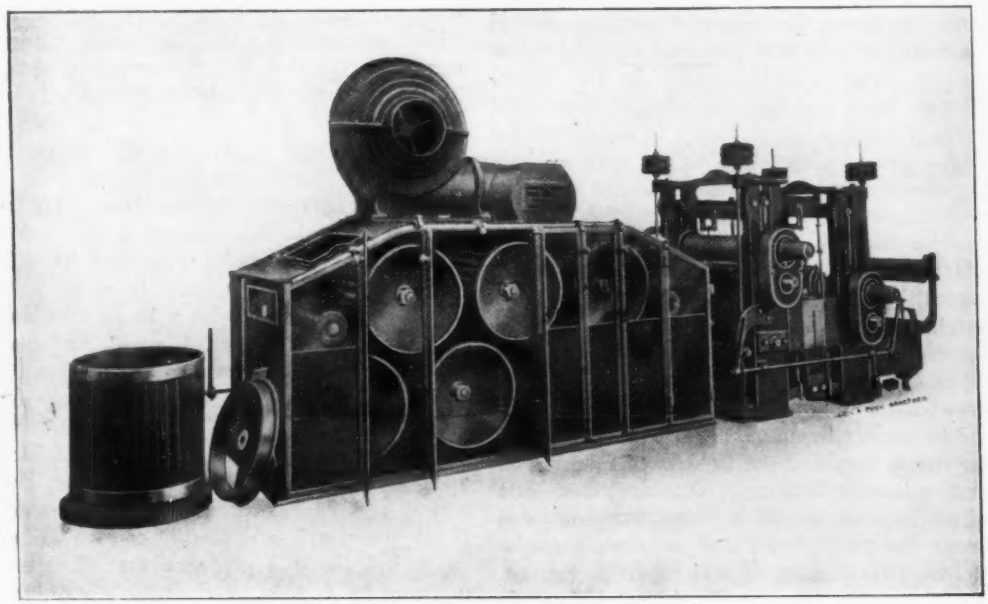


FIG. 6. A HOT AIR DRYING BACKWASHER

STITCHED DOUBLE FABRICS.

(By Our English Correspondent.)

A correspondent has applied for a record anterior to 1897 of the construction of a fabric in which the back and face are stitched by an extra set of fine cotton warp threads; the said cotton threads lying buried in the face or back wool. Fabrics of this kind were being made in Yeadon (Yorkshire) one or two years prior to 1896 to the writer's certain knowledge. Where the construction originated has not been ascertained, but there is evidence both direct and indirect that the method was in use much before that time. The Yeadon goods were cheap golf-cape cloth with a plain face and large tartan check backs, imitating more expensive fabrics of the same type made in Scotland. The same

styles have been in and out of fashion since and heavy cloths so constructed have been made for overcoatings both by Yorkshire and Scottish firms. It would not be surprising were these "check backs" soon to come into favor for overcoats again. This winter's fashion in England is for overcoats lined with so-called "fleece"—really a stockinette, raised fabric mostly plain brown in color, but sometimes styled in stripes of green or gray, etc.

This stockinette is of course a separate fabric, costing, according to quality, from $1 to $5 a yard, and it is used in substitution for other lining by the tailor. The cloth inquired about is self-lined and comes all of a piece from the loom, the face and back are simultaneously woven and the third warp of a few cotton threads, held tightly in the loom, stitches back and face together by a suitable arrangement of interlacing. It would not be impossible to dispense with the cotton binding threads, but in the heavy fabrics used for golf capes and traveling rugs, the face is heavier than the back and it would be impracticable to join the two without doing the very thing the maker wishes to avoid. He would have to introduce to the back some of the face coloring and it is essential to some schemes that this should not be. Were this drawback not fatal, there would still remain the inequality in the sizes of yarn as between the heavy face and the light back, making at best a badly balanced structure, and one which in wear would lead to "bagging" between the two fabrics and to other unsatisfactory effects.

The purpose served by taking an independent stitching thread is fairly obvious. If it is asked why cotton is taken instead of worsted or woolen the answer may take the form of a query. Why does the tailor use cotton for sewing? The manufacturer's reason is the same. Cotton does not stretch, it is fine and it is strong. Were cheapness the sole object the manufacturer would use no cotton at all but would make shift to unite the fabric with the face and back threads of woolen. The business of the cotton binding is not to appear, but simply to make a neat and inconspicuous joint. The number of threads to use varies with circumstances, but the number is in any case few relatively. A first-class designer who has been over 25 years in the mill, writes that "these middle warp stitched goods have been made nearly as far back as I can remember" and suggests that the cotton threads should be warped at every 4th, 8th or 12th thread as seems best. As to the weaving of them, Dr. Oliver of the Galashiel Textile School calls

1 face 1 back for 8, 1 stitching
1 face 1 back for 4, 1 stitching
1 face 2 back for 6, 1 stitching

common arrangements.

The case has been dealt with thus far as one of producing thick, reversible fabrics in which bulkiness is a leading feature. But the same construction has been used in producing the lightest possible reversible worsteds. The information is given by a manufacturer of twenty years' experience who states that the middle warp arrangement was in use when he came into the business. To illustrate the use in this direction, an extreme and uncommon requirement may be taken. Suppose it to be necessary to make a fine, lightweight worsted with a black face and a white back. No thread could be carried through without appearing and spoiling the goods and the thinner and finer the fabric the less it becomes possible to dispense with sufficient ends in a middle warp to hold front and back together. Circumstances under which a third or stitching warp is imperatively necessary are doubtless rare in worsteds, but there is evidence that the idea is not new by twenty years; to say nothing of its possible or probable greater antiquity and of the exceeding likelihood of the same arrangement having been used in the cotton industry by manufacturers of quilts.

A friend deposes that it was in the year 1892 that he first made acquaintance with cloths of this construction. He met with them in that year in a batch of patterns received from a Paris firm of pattern dealers.

One reference occurs in print. The "Journal of the Bradford Textile Society" of the date February, 1896, reports a lecture on "The Principles of Double Cloth Construction" by J. A. Lancaster. The report states

that the lecture was delivered "at the end of last term," i. e., late in 1895. Amongst the fabrics used by the lecturer to illustrate his remarks was: "One which had been extensively worn for the past couple of years in the form of ulsterings for ladies' wear." The report continues: "It was pointed out that these fabrics differ from the majority of double cloths by having a coarser face than back, so as to allow of a fine checked lining being formed. These fabrics were generally bound together by a thin cotton warp which in no way interferes with the appearance of either side."

TESTS OF WOOD PRESERVATIVES.

BY E. UHLER.

With but few exceptions, every manufacturing plant or mill has a variety of wooden structures, such as board fences enclosing the property, doors, gates, floors, trestles, platforms, towers and tanks, flumes and mill races, roofs, etc., and for very obvious reasons the owner is not particularly pleased over the fact that this woodwork quickly succumbs to rot and decay, thus necessitating frequent renewals. That such renewals entail considerable expense is frequently evidenced by the dilapidated appearance of the woodwork, and yet nothing reflects so much upon a manufacturing plant or mill than to see the woodwork in and about the same in a dilapidated condition. This does not speak well for the orderly management of the plant, which like the character of a man may often be judged by its external appearance, for the same rule can be and is applied when the outward appearance of a plant is shabby.

Fifteen years ago, having experienced much trouble owing to the premature decay of woodwork exposed to the varying influences of the weather, I determined to undertake a series of careful tests with different preservative materials known at that time. Of the five wood preservatives mentioned in this article, only the one, consisting of a treatment of the wood with milk of lime and dilute sulphuric acid, has fallen entirely into disuse, while the others are still more or less in use up to the present day.

It is a well-known fact that the conditions most active in starting and furthering decay of wood are found where wood comes directly in contact with the ground. The kind of wood selected for these tests was pine, because this is the wood that is used almost exclusively for structures such as above referred to. The test pieces referred to were poles, and these were stripped clean of all bark and then driven into the ground, but only so far that they could very easily be dug up. The character of the soil was carefully examined so that all test poles could be subjected to exactly similar conditions. Five different preservative methods were tested, as follows:

1. Coating with tar.
2. Coating with Avenarius Carbolineum.
3. Coating with substitute Carbolineum.
4. Immersion in lime water followed by a subsequent immersion in dilute sulphuric acid.
5. Charring of the wood.

In the Alpine country and in other districts where the wood can be more easily transported in winter than in summer, and as there is the further advantage that wood cut in summer is more easily stripped of bark than that cut in winter, it is customary to do the cutting of timber almost exclusively in summer while the sap is up, while in the other districts the timber is cut in winter when there is no circulation of the sap. This latter wood has been proven to be far more durable than the other, but as there are still many who doubt this, I have extended my tests so as to cover both methods or rather seasons of cutting the timber. There were therefore a total of ten test poles, which were designated as follows:

SUMMER CUT WOOD.

1, Brush coated with tar. 2, Brush coated with Avenarius Carbolineum. 3, Brush coated with substitute Carbolineum. 4, Treated with lime water and sulphuric acid. 5, Charred.

WINTER CUT WOOD.

6, Brush coated with tar. 7, Brush coated with Avenarius Carbolineum. 8, Brush

coated with substitute Carbolineum. 9, Treated with lime water and sulphuric acid. 10, Charred.

No material change was evident during the first two years, and thereafter the results observed were as follows:

After a lapse of three years test poles 3 and 4 were slightly rotted; in four years, 3 and 4 showed considerable rot; in five years, 3 and 4 were rotted through, and 5 affected somewhat with rot; in six years, no further change was noticeable; in seven years, 5 rotted through and 1 beginning to show rot; in eight years, 1 rotted through, and 8, 9 and 10 showing some rot; in nine years, 10 rotted through; in ten years, 8 and 9 rotted through and 6 beginning to rot; in eleven years, 6 completely rotted; in twelve years, no further change noticeable; in thirteen years, 2 showing some decay; in fourteen years, no further change was noticeable; in fifteen years, 2 rotted through, and 7 almost like new.

This table brings out a very peculiar and striking manifestation, namely an exact coincidence of the resistance which the different preservatives or preservative methods afford the wood in comparing the summer and the winter cut woods, that is, it demonstrated that the latter resists decay for seven years longer than the former, thus clearly verifying the truth of my foregoing statement, that wood cut in winter will resist decay longer than the same timber will if cut in summer. The difference in the durability of the treatment with genuine Avenarius Carbolineum against that with imitation Carbolineum is equally striking, and everyone is aware of how little can usually be expected from cheap imitations, and further that in this particular instance the difference in price is negligible.

In the light of results shown by these experiments I cannot understand why at the present day the various electrical or wire companies, when erecting poles along their transmission lines, still retain the two methods of treatment, that is, either charring their poles at the butt end or treating with a coating of tar, notwithstanding that their past experience has shown the results obtained by these two methods are very unsatisfactory. I know of one electrical company which found it necessary to replace part of their poles after a service of only three years, and practically all of their poles after six years, even though most of them were larchwood poles and had been treated with a tar coating or else charred at the butt. Many an owner of a similar plant may be able to profit by the experiences above related.

The soil selected for making the above tests was of a nature very favorable to decay of the wood implanted in same, it being a sandy soil in which the poles could absorb moisture very readily and also dry out again rapidly. A clay soil in which the wood always retains a certain degree of moisture is undeniably more favorable for the durability of the wood.

ENGLISH NOTES.

(By Our Special Correspondent.)

The discreetness of the Bradford Dyers' Association in all that concerns its recent American purchase is more than perfect. It has not even been officially admitted that the plant of the Niantic Dyeing Co., Rhode Island, has been bought. The shareholders have been begged to disregard entirely the statements they see in the newspapers and to believe that the directors would act circumspectly and without haste. It is, however, officially admitted that the directors have "determined to take steps" to acquire American works. There may be reasons for saying little. For instance, some English customers may regard the opening of American works as an act unfriendly to their interests. Then the Association has at Handforth (Cheshire) works partially constructed on which work has been suspended for two years, although a large part of $1,000,000 has been expended on them. Furthermore, the Association conceivably does not wish wantonly to provoke the lion of American competition. To remove misconceptions that may have been fostered by inaccurate New York newspaper reports, be it pointed out that the Associa-

tion is by no means short of work in this country; and that the B. D. A. is a commission dyeing undertaking—not a manufacturing enterprise, as has been erroneously represented. A closer account of its operations was given on page 335, Textile World Record for December.

* * *

The authorities in England continue to deplore the neglect of factory workers to make use of the appliances provided for their own safety. A committee of inspection found in one large weaving shed "dozens of shuttle-guards either loose with broken springs or forcibly tied back to render them ineffective." This is the old tale and the general recommendations of the committee are not new, more regulations as to dangerous machinery, more adequate lighting, more repairs to floors and stairways, more space between machines, less lifting and carrying by women and children and more factory inspectors. These constitute the gist of the inquiry and foreshadow the lines which new legislation will take. Conferences between inspectors, manufactures and workpeople are recommended to discuss industrial accidents and measures of prevention; the conferences to come to agreement or to circularize the mills of the district and failing compliance with the requirements agreed upon prosecutions to be undertaken against recalcitrant firms.

* * *

In some recent cases operative cotton spinners have succeeded in obtaining compensation from their employers for loss of wages arising from "bad spinning," *i. e.*, from the use of unsuitable or troublesome mixings from which the ordinary production cannot be obtained. The operatives' leaders do not desire compensation so much as supply of spinable cotton. The Employers' Federation is on record as saying it desires to place no obstacle in the way of payments of fair and reasonable compensation where loss of wages is proved.

* * *

Two spinners' representatives have seats on the managing Board of the Liverpool Cotton Association, but have no votes. The control of that Association is entirely in the hands of brokers and importers, who make the rules of the market. These men have steadfastly refused in the past to make cotton lying in Manchester tenderable under Liverpool contracts and it does not seem that they will readily assent now. Sufficient determination shown by English spinners may break down the refusal and an attempt in that direction is to be made. The Manchester Cotton Association is more insistent than ever upon having its own futures market in its own city and probably this season will see a market instituted. The Manchester contract will be shaped more to suit spinners' ideas than the Liverpool one has been, and, market or no market in Manchester, the outcome may well be some modification of Liverpool conditions. Liverpool men argue that the market may be in one place or in another, but that it cannot possibly be in two places. Doubtless there are managers who do not wish to end their trips to Liverpool and there are certainly brokers who do not wish to go to Manchester, but there is every assurance that serious business is intended.

* * *

Selling and advertising, rather than mill departments may be interested in the "All-British Shopping Weeks" that are being held in all parts of this country. As the name suggests, retailers agree to display none but British-made goods during a certain week. Drapers have been especially active in the matter and the occasion has been seized by manufacturers of advertised and branded goods. Except for French silks and amazons, Chemnitz goods, Swiss embroideries, Mulhouse crochet cotton and fancy articles, the ordinary draper's stock is very British at any time. From the manufacturer's point of view the arrangement would be all the more satisfactory were retailers content to bear the expense. But drapers have expected manufacturers and wholesalers to send them the wherewithal for an exceptional display on sale or return terms. Obviously this could not be done for everyone when the main means of advertising meant showing a large block of goods. Apparently those are coming out best who supply printed matter liberally and have tableaux and lay figures to lend.

Some of the Indian cotton mills stand accused of false reeling, but the prime offenders in this respect are the Italians and Austrians who export to the Levant. Many general complaints have been laid against them and some particular information is given in the official bulletin of the Roumanian Government. This sets forth that the Roumanian peasantry are accustomed to buy 10-pound bundles of 4s to 24s English counts. But instead of 840-yard hanks Austrians and Italians have been supplying hanks of 640 and been marking as 16s yarn which is barely equal to 12s. They have been stamping calico with numbers supposed to indicate yards, but bearing no actual relationship to the length of the piece. With these mischievous practices in view the Government has issued notice that the laws as to weights and measures are to be strictly enforced. The sooner honest measures are enforced in Turkey the better will it be for American exporters.

* * *

Woven waistcoatings in neat little sprig and fancy effects are the special province of a few Huddersfield firms. Knitted waistcoats have, at least for winter, encroached on their ground and have had a really considerable sale. Now a Derbyshire lace manufacturer has evolved a new thing in fad clothing in the shape of lace-trimmed waistcoats for men. Black lace tailor-sewn upon a purple cloth foundation is one of his notions in the way of morning wear. White lace sewn on a sea-green fabric is a specimen idea for evening dress. It is too early to speak of the reception of these novelties, which if favorable may clear the way for some elaborate woven styles.

* * *

As worsted capital is nearly all private in this country there is little in the way of published results to show what money has been made of late. Spinners have had the best two years that the present generation has ever known and have been pocketing a clear excess profit of 4 to 6 cents a pound on nearly everything turned out. Spinners have done better than the weavers to whom they sell, but the latter have made good prices. Combers advanced their charges in the middle of last year and Woolcombers, Ltd., have made $423,000 instead of $362,000 and have paid 11 per cent. on their common stock. Slubbing dyers had a more prosperous year than seems probable this time and the Bradford Dyers' Association profits suggest that piece-dyeing was good, for the trading profit of $2,036,000 is a quarter of a million dollars larger than the year before. The B. D. A. profits come from cotton as well as from worsted.

In the carded woolen line Mark Oldroyds report $140,000 net, which is slightly more than in 1909 and less than 1907 and 1908. Competition, dear yarns and dear soap and oil are complained of by these people, who are the chief parties in the medium men's tweed trade. J. T. & J. Taylor of Batley, after doing a higher turnover than ever before, deplore a fall in the rate of profit, but as stockholders get 12½ per cent. and wage earners a bonus of 7½ to 15 per cent. upon their wages, the result is not utterly disappointing.

* * *

A mohair importer addressing the Bradford Wool Association thought it desirable to refer to the large number of Bradford men who are simply working for the banks, conducting large and apparently prosperous businesses and yet securing only a bare living for themselves. The remark applied apparently to wool dealers, although this is a plight in which manufacturers have found themselves in times past. Bank charges just absorb the surplus and prevent the man who is working the money from growing richer out of ordinary trade. A year or two of high profits can alone extract the overweighted victim from the toils. But banks have amalgamated until finance is in few hands and those hands are not disposed to let the man who is already owing a substantial sum speculate too freely with their money. The difference between English and American finances was pointed out on one occasion by Francis Willey in words something like these: "In America a manufacturer has the chance to raise money on his own notes at three

months or six months. There is a market for them. But if I go to an English bank I am promptly told the bank wants all my business or it wants none." For his own protection the English bank manager insists on seeing all that his debtor-customer is doing and annually or oftener demands a certified balance sheet. Consequently many traders here are solvent just to the extent that the banker will meet their monthly checks for goods and their weekly needs for wages. When the dealer or manufacturer fails it is usually found that the bank holds a large part of the security.

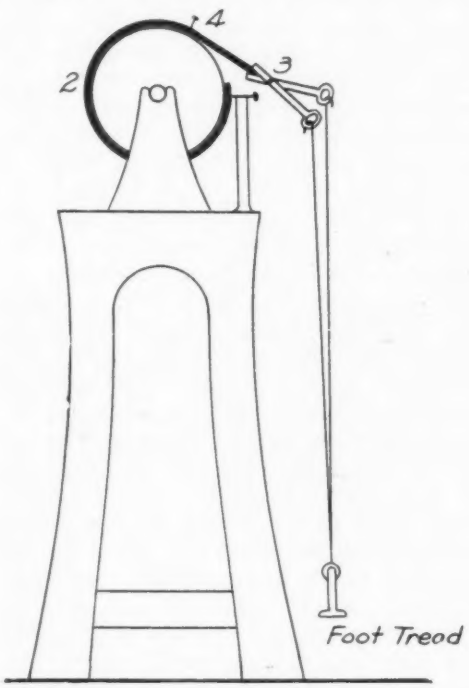


FIG. 1.

A wool banker has supplied me with some particulars of some charges Bradford bankers make. Their rate for commissions ranges from an agreed annual fixed sum to a rate of one-twentieth to one-eighth of one per cent. The discount rates are those daily quoted for fine trade bills in the London market. On overdraft for wool imported in January-April on letters of credit the interest is 4 to 5 per cent. and the customer has to provide a 20 per cent. margin. For money lying on current account the interest allowed varies from 1½ to 2½ per cent.

ROLLERS AND ROLLER COVERING FOR DRAWING AND SPINNING WORSTED.

BY JOHN BROWN.

Ever since the introduction of machinery for drawing and spinning purposes, the root principle of which is, two sets of rollers running at different speeds, the back rollers de-

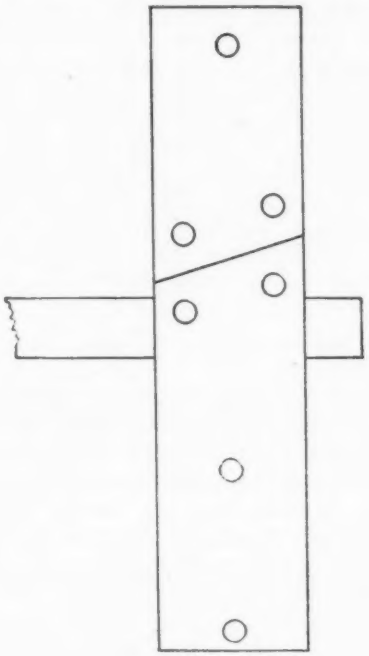


FIG. 2.

livering slowly, and to a certain extent holding back, and the front rollers traveling at a great speed, thus increasing the length and decreasing the thickness of the stock, it has been found necessary to have one roller in each pair either made of or covered with a substance more elastic than the iron bottom rollers. Not only for the purpose of obtaining a better grip on the stock, but also to prevent cutting the fibers. Except in the processes where carriers intervene between front and back rollers, both back and front top rollers are leather covered. Many substi-

tutes have been tried with more or less success, but up to the present time, for good grip, elasticity and long wear combined, there is nothing like leather. Formerly all top rollers had wood bosses, the larger ones for drawing being made from segments screwed to the hub, while spinning bosses were turned out of one piece. Where wood rollers are used, great care must be taken in the selection and seasoning of rough bosses before fitting them on arbors, otherwise the heat and pressure to which they are subjected will cause them to warp and split.

Four different styles of pressing rollers are now in general use; hard and soft covered wood rollers and hard and soft covered iron rollers. In preparing wood rollers for hard covering the bosses are first turned up true (in recovering there is just enough taken off to clear away the old glue and leave a clean surface) and must be finished with a sliding cutter in order that both bosses shall be exactly the same diameter. They are then covered with a strip of the best oak tanned oxhide leather, which has previously been well stretched.

In order to fix the leather on tight to the boss, one end is fastened on it with two long nails, which can be easily withdrawn, the boss having been previously well coated with glue or cement, and the leather slightly scratched on the under side, as shown at Fig. 1. The boss is then drawn around on its holder until the nails catch on the rest, thus holding the boss firm, and the other end drawn over with a pair of strong pliers through the longer arms of which a strap passes. The workman presses his foot in a stirrup at the end of this strap and thus tightens the grip of pliers, at the same time drawing the leather covering tight on the boss. When it is full stretched two more nails are inserted as near the joint as possible, and the leather is cut to form a diagonal joint and the roller is put in a dry place for the glue to set and the leather to dry. In the course of a day or two the iron nails are withdrawn and shoemaker's wooden pegs put in their place.

The rollers are then placed in a lathe and skimmed sufficiently to leave a perfectly level surface. After sandpapering, water is lightly applied with a sponge, and the finishing polish is obtained by pressing a block of polished boxwood on the roller as it rapidly revolves in the lathe. The roller is now ready for use.

Iron rollers that are hard covered require two coats of leather. The first covering should have three or more fastenings besides the pegs used at the joint. For this purpose several holes 1/4 of an inch in diameter are bored in the iron boss, as shown at Fig. 2. These holes when tightly plugged with wood, make a good base to which the under leather can be fastened with pegs and greatly assist the cement in keeping the leather firmly fixed. A good plan before fixing the first coating is to warm slightly the iron boss. If made too hot the iron contracts when cooling and there is danger of breaking the cement. The second or outer covering of leather is then fixed in the same way as on hard covered wood rollers, taking care that the diagonal joint is on the opposite side of the rollers to the joint in the under leather.

The reason why so much care is needed both on stretching and fixing the leather on hard covered rollers is that the leather covering when in use is being constantly rolled between two hard surfaces, and the leather soon leaves some part of the boss, however well fastened at the joint, and to use a popular term "bellows." Every time the "bellowsed" part comes around uneven roving or yarn will be the result. To detect this all top rollers should be periodically examined. The fault cannot always be seen, but by pressing the hand on the surface of the roller while running, a "bellowsed" roller can easily be detected and should be replaced at once. In some mills rollers are never taken out, unless they have this fault or are badly worn or come loose at the joint.

A far better plan, when a few rollers show signs of wear, is to take out the whole side and have them skimmed up and repolished, replacing them with a full set kept for this purpose. This is soon done and as the diameter of the top roller makes no difference to the draft, it is immaterial whether they are replaced with a larger or smaller

set. Of course there is a small advantage in having rollers of large diameter, because they present slightly more surface at the nip, thus requiring less pressure to secure the same amount of grip. For this reason it is not wise to use wooden bosses turned down by repeated recovering until they get very small. Besides this, the wooden bosses are not very expensive, and the saving in pressure and the advantages of a greater surface with only one joint, more than makes up for the cost of new bosses.

Soft covered rollers. Generally all the larger rollers in drawing, and also the spinning rollers for low qualities and even for mohairs up to 40s are soft covered, that is, the leather covering is not glued or cemented to the boss. But before being slipped on to the boss, it is made into a sort of sleeve or collar, the butt joint sewed on the under side with fine stitches, drawing the two edges of the joint firmly together.

In all cases a covering of thick felt, to give elasticity, is first placed on the boss, under the leather covering. One of the advantages of soft covered rollers is that owing to their greater elasticity, thus slightly flattening at the nip, they have a firmer grip on the stock than have hard rollers with the same amount of pressure. For the finer Botany qualities hard rollers are still preferred. Again there is very little danger, owing to its being stitched, of the joint coming loose. There is no danger of uneven drawing as with a "bellowsed" hard roller. In fact a soft roller may be said to be "bellowsed" all over. Against this must be reckoned the extra amount of leather required for covering, compared with hard rollers, because the edges have to overhang so that in the case of wood rollers the leather can be nailed on the sides and laced with strong twine on iron rollers.

The surface of the leather wears longer when soft covered, but when once worn it cannot be turned up and repolished as the hard covered rollers can. For fixing leather to bosses on hard covered rollers a mixture of 3 parts common glue and 1 part Russian gelatine is prepared with water in an ordinary glue kettle. A stronger glue for fastening leather to iron bosses is made by using skimmed milk instead of water mixed with glue. This takes several hours to prepare, as it should simmer very slowly. There is an advantage in making a rather large quantity of this mixture at one time, as after it is once properly made, it grows stronger every time it is warmed up. If it gets too thick it must be reduced by adding small quantities of well skimmed milk. A few drops of carbolic acid helps to keep it from going sour. One pound of glue and two pounds of skimmed milk are the proportions.

A cement for fixing the leather to the iron is made by mixing 16 parts gutta percha, 4 parts India rubber, 2 parts pitch, and 2 parts of boiled oil. These must be melted together and applied hot. Another good cement is made from 12 parts glue with enough skimmed milk to dissolve it. When thoroughly melted add 3 parts of yellow resin. When this has melted, add 4 parts turpentine. Let this mixture simmer well in a glue kettle before using. A handful of common salt put into the water in the outer kettle will enable it to reach a higher temperature than 212°, thus facilitating the melting and mixing of the various ingredients.

ENGINE SPEED REGULATION IN TEXTILE MILLS.

Reports of Tests made by the Chief Engineer of the Vulcan Boiler and General Insurance Co., Ltd., (Manchester Eng.) and the Consulting Staff.

(Continued from March.)

We also give in Table 3 particulars of the total variation of speed, momentary and otherwise, as obtained by analysis of the tachographic records, which further show that under the Lumb system the momentary fluctuations are not only reduced in value, but also in the length of their period.

From the above it will be seen that by the adoption of the Lumb system the total variation in speed has been reduced from 4.5 per cent. to 1.8 per cent., or, in other words, the variation of speed has been reduced two and a half times.

OBSERVATIONS.

We consider that the governing of the engine under the original conditions was considerable better than the average for engines of this type, and that the improvement which has been secured has brought up the governing to an exceedingly high efficiency. We would point out that there is an absence of reliable records of speed fluctuation, and that many of the figures quoted in reference to uniformity of speed are far from being correct. Owing to the improvement in regularity of speed, the production of the mill can be increased, and the quality of the yarn will also be improved. With the original system of governing the maximum speed was equal to 77.9 revolutions per minute, but the average speed was only equivalent to 76.2. With the new system of governing the engines could be run at 77.2 revolutions per minute, and the maximum speed would not at any time exceed that under the old conditions, namely 77.9. This increase of speed is equivalent to a gain of 42 1/2 minutes on a 55 hours' week. At the time these tests were made the average speed had not been increased, but this was due to special conditions, and instructions in reference thereto.

It should be noted that the Orb Mill is fitted for mule spinning, and therefore the load is of the irregular character appertaining to textile mills with this type of machinery. Full particulars of the machinery in operation during each test were obtained, and the following particulars are abstracted:

December 15, 1909. Blowing room, 52 cards. Preparation and roving, 23 pairs mules. Average counts, 62 weft.

April 27, 1910. Blowing room, 54 cards. Preparing and roving, 22 pairs mules. Average counts, 58 weft.

Particular attention has been given by Messrs. Lumb to ensuring the safety of the engine, and for this purpose a simple arrangement of knock-off gear is provided on all the governors which they supply. This safety gear operates for both high and low speeds, and the knock-off gear is arranged so that it can be set to come into action for either a large or small variation in speed, being equally certain of action under either condition. In the earlier forms of Lumbs' motion there was in some cases a possibility of accidental derangement of the gear, which would allow the engine to run at an excessive speed.

Messrs. Lumb entirely redesigned their gear some years ago, when this defect was entirely eliminated, and the safety knock-off gear which is provided with Messrs. Lambs' governing system is of a very reliable design and certain of action.

TABLE III.

Total Variation in Speed, Including Momentary Variations Under Ordinary Working Conditions, With Regular Steam Pressure.

	With Maker's Governor	With Lumb System
Average Speed	76.4 revs.	76.02 revs.
Total Variation in Speed	3.4 per cent	1.7 per cent.
Equivalent Variation in Revs.	2.6 revs.	1.3 revs.
Equivalent Maximum	77.7 revs. to	76.67 revs. to
Minimum Speeds	75.1 revs.	75.37 revs.

Total Variation in Speed, Including Momentary Variations and Inclusive of Period With Steam Pressure Reduced as stated in text.

	With Maker's Governor	With Lumb System
Average Speed	76.2 revs.	76.00 revs.
Total Variation in Speed	4.5 per cent.	1.8 per cent.
Equivalent Variation in Revs.	3.4 revs.	1.4 revs.
Equivalent Maximum	77.9 revs. to	76.70 revs. to
Minimum Speeds	74.5 revs.	75.30 revs.

The National Association of Cotton Manufacturers.

The annual meeting of this association was held in Huntington Hall, Technology Building, Boston, on April 12 and 13.

The large hall was well filled when President Hobbs called the meeting to order. Gov. Foss of Massachusetts had been expected to welcome the manufacturers, but on account of illness was unable to be present. While his coming was awaited, the secretary's report and announcement of award of medals was read.

President Richard C. McLaurin of the Mass. Institute of Technology then welcomed the guests in an eloquent and extremely interesting address, in which he pointed out the value of a technical educa-

FRANKLIN W. HOBBS, RE-ELECTED PRESIDENT OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

tion and took occasion to allude to the new science of efficiency and scientific management, his idea being that manufacturers should select young men with scientific training and fit them for the special field of manufacture in which they were to engage.

President McLaurin was followed by Col. E. D. Meier, president of the American Society of Mechanical Engineers, who said in part:

Gentlemen: This is rather an unexpected pleasure, and as the young ladies say on certain occasions, "so sudden," but it is always a pleasure to me to address the cotton manufacturers.

I was for a number of years associated with the cotton manufacture in the West myself and in my early youth was an operative at the Mason Machine Works and learned to make cotton machinery, so I have a very friendly feeling for it.

As president of the American Society of Mechanical Engineers, I am especially glad of this opportunity to say a few words to you.

The mechanical engineer of today is merely the mechanic of fifty or sixty years ago, with the results of scientific investigation placed before him in such schools as this Institution of Technology where he is instructed in such manner as to make him valuable for use in all industries.

Now the cotton industry in this country has been of marked service to the mechanical engineer in the past. I understand from my friend, your secretary, that there are several schools for training textile workers in this state, some of them closely connected with the early beginning of your industry.

Afterwards, when it became necessary to have power plants to supply water power, which at that time seemed inexhaustible, the result was the development of the hydraulic engineer along the lines of building dams, flumes, etc., which led to the invention and working out of this line by the celebrated Massachusetts mechanic Uriah Borden.

In my youthful studies I learned that Francis stood at the head of hydraulic engineering of the world.

I recently compared notes with others and found that his economics have not yet been excelled by modern men.

Now these inexhaustible supplies of water power were overtaxed by the demands of your industry and the result was improvements in engineering foremost in connection with which stands the name of George Corliss. It is no exaggeration to state that from this date of the invention and adoption of the Corliss engine, great eeonomy in steam engineering became possible.

Now, furthermore, the necessity for improvement in the method of manufacture has brought forth classes of economies in New England which for a time were unexcelled in any part of the country and their designs have superiority over the West. You will find in certain districts in Ohio, Wisconsin and Michigan certain plants well known throughout the world for the building of machinery of different kinds and there you will find designs of those very Yankee mechanics started one hundred years ago.

Now as I stated before, the mechanical engineer is largely indebted to the cotton industry. In my position as president, it becomes my duty to protect the work of the society along all lines belonging to it and I have recently taken pleasure in appointing a committee especially devoted to the working up of discussions at our meetings, the development of various mechanical devices embodied in your cotton machinery of today, so that you see that in starting out from your industry we always come back to it and to its development which you have made, but which were not known to the mechanical engineer of the old generation, intending to bring before them for discussions these subjects. Those that have been developed in your industry will be of great use in other industries.

So it gives me great pleasure to state that the American Society of Mechanical Engineers will be very glad to cooperate with the cotton manufacturers in any further development.

President Hobbs then delivered his address.

President's Address.

FRANKLIN W. HOBBS, Brookline, Mass.

In opening my address at Portsmouth last September, I remarked that "the cotton manufacturing industry has been in troublous times since we met in April last" and I regret to be compelled to state that the troublous times have continued. The cotton crop has been a disappointment in size and in character it is one of the poorest and most wasty known. Curtailment has continued and the contest between the buyer, who is attempting to force down prices, and the manufacturer who is trying to get at least cost for his product, continues and a most unsatisfactory condition has resulted. Buying is on a "hand to mouth" basis. Added to perplexing business conditions has been the upset political situation and the uncertainty due to expected decisions of the Supreme Court which will have far reaching effects. Congress has now assembled in special session and we shall soon know what to expect in regard to legislation and the Supreme Court will give its decisions in the near future. Uncertainty of the future is the most dreaded condition in which business can get. With these two factors removed, we shall know where we stand and be prepared to go forward.

"Misery likes company," and it may interest you to know that for the year ending Nov. 30, 1910, 73 concerns in Lancashire, with a total paid up capital stock of $12,800,000.00 and an added loan capital of $5,400,000.00, showed a loss of $1,315,000.00 after paying interest on loans and allowing for depreciation. The number of spindles represented was 5,973,196. These figures are the worst for twenty-five years. I understand, however, that there has been some improvement during the past two or three months and the spinners are now said to be working at a slight profit. While conditions here have been most unsatisfactory, I am happy to state they have not been like those in England.

Retail trade all over our country seems to be good and business in general has been, on the whole, satisfactory outside of textiles. That condition cannot continue indefinitely and if general prosperity continues we must inevitably get our share. In this country no one industry can prosper without general prosperity. It is equally true that no one industry can suffer adversity for long without in the end bringing about general adversity. It is well to remember that we must stand or fall together and that prosperity for one means prosperity for all.

THE WORLD'S SUPPLY OF COTTON.

It is undoubtedly true that the consumption of cotton is steadily increasing each year and it seems equally true that this increase in consumption will continue. It is estimated that there are now on the earth 1,500,000,000 people of whom only 500,000,000 are completely clothed, while 750,000,000 are only partly clothed and 250,000,000 practically do not possess any clothing at all. It is further estimated that to clothe the whole of humanity would require 42,000,000 bales of cotton each year instead of about 17,000,000, the last year's production of the world. The number of cotton spindles in the world has increased from 105,700,000 in 1900 to 134,500,000 in 1910 or 27.3 per cent. The fluctuations in the world's supply of cotton are measured practically by the variations in the production of cotton in our country, as we produce over two-thirds of the supply. The world consumption of cotton fr the year ending Aug. 31, 1910, is estimated by the United States Census Bureau at 18,079,000 on the basis of bales of 500 pounds net weight and the production for 1909 amounted to only 16,588,000 bales net weight, or 1,521,000 bales less than the consumption. The world's consumption for the year ending Aug. 31, 1909, was 19,397,000 bales net weight. With increases of machinery which have been made, it is evident that the consumption of the mills of the world on full time would be not less than 20,000,000 bales.

The query thus arises: Where will the additional amount of cotton needed for the world and its increasing population come from? This is a question which up to the present time has occupied the attention of the English spinners more than our own, but it seems we are as vitally interested as any nation, for whatever affects one nation today affects every nation, and we may well consider briefly the situation as it is today and as it may be in the near future. The production in 1909 may be considered in round numbers, on the basis of net weight bales, as follows:

	Bales.	Per Cent.
United States	10,000,000	59.6
India	3,600,000	21.8
Egypt	900,000	5.5
Russia	700,000	4.3
China	600,000	3.6
Brazil	350,000	2.2
Other Countries	500,000	3.0
	16,650,000	100.0

In the first place, let us consider our own country. We have gone ahead without much effort and raised as stated fully 70 per cent. of the world's product. We are now just beginning to realize the possibilities of the problem.

The United States Department of Agriculture has been making experiments and investigations for years and they are but now beginning to bear practical results and I believe in the near future we shall see great improvements in methods of cultivation and in the character and quantity of cotton if the farmers will generally avail themselves of the services given so freely by the government. In this respect we lead the world and we ought to receive the benefits.

I think I am not too optimistic to believe that from the present acreage the production could be doubled if proper methods were used and it is along such lines that our friends in the South must work to secure the best results for themselves and the spinners. To improve methods of cultivation we must add a better method of picking, which is so much before us at present and which is certain to be realized in time, and a general improvement in every step and process between the planting of the seed and the delivery of the cotton to the mill. We have too long drifted. The time is now ripe for concerted and determined action if we are to maintain our commanding position.

If we turn to the other side of the world we find the English spinners especially, and to a great extent those on the Continent, determined to increase the production of cotton, equal to American cotton, outside of our country. In this determination the British Cotton Growers' Association, with the aid of the National and Colonial governments, is very much in earnest as are all the members of the International Federation of Master Cotton Spinners' and Manufacturers' Associations. This entire subject was discussed by Professor Dunstan in a report which he presented to the International Congress of Tropical Agriculture held in Brussels in May, 1910, and, in the official report of the International Committee of the Spinners' and Manufacturers' Associations, held in London in November, 1910, especial stress was laid on the importance of continuous experimental work under government auspices, as the problem in most countries is to establish an acclimatized type of cotton suitable for the spinners. Progress, while at present slow, seems to be steady.

The Egyptian government has now created a department of agriculture which has been needed so long to afford guidance and aid to the cultivator and to conduct experiments. In this connection it is a pleasure to note that Professor Dunstan stated in speaking of American cotton: "This report, moreover, emanates from one of the best equipped and most efficient agricultural departments in existence. As agriculturists and as men of science we may pay a tribute to the enterprise and farsightedness of the government of the United States in having organized and maintained a department which has been able to render such signal service to the agriculture, not only of our own country, but to all those countries where agriculture is of first-rate importance, and most of all in those in which cotton cultivation is carried on."

While the outlook in Egypt is not considered satisfactory, the possibilities of Egyptian agriculture have been enormously increased, by the construction of the Assuan Dam, and it is hoped in the near future to bring a large area under cotton cultivation in the Anglo-Egyptian Sudan. The government is prepared to grant substantial financial aid to the farmer who engages in the production of cotton, thus removing one of the great obstacles in the development of the industry. With the establishment of the department of agriculture, the increased water supply and the financial aid of the government we may well expect great development in Egypt.

West Africa presents one of the most promising new fields and cotton cultivation and experimental work is being carried on there in the colonies and protectorates of Great Britain, France, Germany and Belgium. In portions of that country, cotton cultivation has been carried on for centuries by the natives. It is a somewhat coarse and short staple cotton, and now the problem is to extend the area and to produce a kind that will be suitable to the country and fill the requirements of the European spinners.

In Nyasaland success seems to have been met, and a new cotton to be known as "Nyasaland Upland" has been established. This cotton is said to be fully equal to the best "American Upland" and to satisfy the tests given it by Lancashire spinners. Uganda is also a promising field, and progress has been made in other parts of West Africa, especial attention being drawn to the development which will probably follow the opening of the Northern Nigaria railway.

India is another country with great possibilities. Many experts claim that in four or five years India could produce a crop of 10,000,000 bales of cotton, and others state that the present acreage under cotton alone would suffice to produce a crop equal to that of the United States, if proper methods of cultivation were introduced. While it is true that a certain prejudice has existed against India cotton that will be overcome as the quality improves, as a result of a better understanding of conditions. In India there is an excellent department of agriculture, a great agricultural population, and the cotton plant is indigenous to the soil, for its fiber has been used in making cloth for thousands of years. Add to that the capital and energy of the British interests and I believe we may expect with certainty a great cotton crop in the near future in that country. While Indian cotton may not be suitable for use in our mills or those of England, every bale raised there will be used for some purpose, and means the displacement of a bale of American cotton.

In the same report accounts are also given of the progress made in cotton cultivation in French, German, Dutch, Portuguese and Italian colonies, as well as in South America, the South Sea Islands, Japan and China. In the latter country alone the production of coarse cotton has now grown to 600,000,000 pounds annually, and it is expected that amount will be increased.

Such in brief is a summary of the work that is being done in other parts of the world to increase the production of cotton, and in this work the British Cotton Growing Association is the most active and aggressive agency. The British Government has decided to assist its operations by the grant of $50,000 a year for a term of years, and it is believed that the Chancellor of the Exchequor will substantially assist the work in the Sudan. With such activities abroad are we fully alive to the situation at home and its possibilities?

In the old book of Ecclesiastes we read: "There is no new thing under the sun." and while we are now awakening to the need of conservation of national resources it is well to remember that George Washington, when President, wrote:

'It must be obvious to every man, who considers the agriculture of this country (even in the most improved parts of it), and compares the produce of our lands with those of other countries, no way superior to them in natural fertility, how miserably defective we are in the management of them: and that if we do not fall on a better mode of treating them, how ruinous it will prove to the landed interests. Ages will not produce a systematic change without public attention and encouragement; but a few years more of increased sterility will drive the inhabitants of the Atlantic States westwardly for support; whereas if they were taught how to improve the old, instead of going in pursuit of new and productive soils, they would make those acres which now yield them scarcely anything turn out beneficial to themselves."

Mr. James J. Hill in his recent work called "Highways of Progress," states: "To raise the productivity of our soil 50 per cent. would be an increase greater in value than the entire volume of our foreign trade. These results can be brought about only by a general understanding and practice of agriculture as modern science and experiment would explain it."

Swift, in his "Gulliver's Travels," wrote: "And he gave it for his opinion, that whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind and do more essential service to his country, than the whole race of politicians put together."

Our government, through the work of the Department of Agriculture, is now trying to make not only two ears of corn and two blades of grass, but two bales of cotton to grow where one grew before, and this great work deserves our hearty support and commendation.

What can we as an Association do to further the great work of this department of our government? What can we do to make the cotton growers realize the necessity of action along the lines recommended by these officials, able and untiring in their activities to increase the quality and quantity of cotton? Think of it, gentlemen, the rest of the world as actively trying to find means to increase the production of cotton, and we continue in the old ways of producing and handling, and, it is safe to say, little improvement has been made in years. How long shall we let this condition continue?

It has been estimated that only about one-third of the available area within the cotton belt of our

country is at present cultivated, and the future extension will depend on the desire of our farmers to plant a greater acreage and to adopt more scientific methods of cultivation, which will result in a greater yield per acre.

We have the natural conditions needed, scientific knowledge, unequalled in the world, and all we need is to apply this knowledge to the God-given soil and climate, and we can well raise 50,000,000 bales of cotton! I trust that as a nation we may realize the possibilities of the situation, and not stand still while other nations reap the benefit of our experience and take from our grasp the supremacy we have so long held as the greatest producers of cotton in the world. We are continuously increasing our manufactures of cotton and as a national policy, in time of peace or in time of war, we must do what we can to maintain our unquestioned supremacy in the production of raw cotton.

CONFERENCE OF MANUFACTURERS.

As a matter of record, it seems well to state that on the 19th of October, 1910, at the request of the officers of this Association, the officers of the American Cotton Manufacturers' Association dined with the former at the Engineer's Club in New York, and at that time your president stated that "there is so much in common in the purposes of the two organizations here represented by their officers that it appears as if the interests of the cotton manufacture would be enhanced by coincident although independent lines of policy and such uniformity of action would have the greater force through the logic of numbers." An informal and interesting discussion was held, and, as a result, our Association invited the same officials of the American Cotton Manufacturers' Association, a committee of the Arkwright Club and a committee representing the cotton growers to meet in the New Willard Hotel, Washington, D. C., on February 2, 1911. Unfortunately, the growers were not represented, although some of them had accepted the invitation, but the other organizations were, and a successful conference was held on the afternoon of that day.

The most important action taken was the appointment of a committee, representing the three organizations in attendance, to consider the whole question of buying cotton and to prepare a form of contract to cover the purchase of cotton. It was understood this would cover the question of bagging, compressing, bales or pounds, the amount of tare, gross or net weights and moisture, and it is hoped that as a result a contract may be made that will be satisfactory alike to seller and buyer and put the whole matter on a uniform business-like basis. This is a matter of the greatest importance to every manufacturer, and if the desired result can be accomplished, and I can see no reason why it can not, it will reflect great credit on the committee and bring about a much needed reform in the industry.

Unanimous action was taken urging the passage of the Week's bill to conserve the forests at the head waters of the rivers in the Appalachian and White Mountain ranges and it is a pleasure to record the passage of that act after so many years of effort. The fact that our Association was the first important commercial body to endorse and work for this project and to solicit the cooperation of all organizations, whose members are dependent on the water powers of those sections of the country, is also a matter of congratulation. Among the letters of commendation which the Association has received since the passage of the Week's bill, is one from a forestry organization which has been actively engaged upon the matter, and two from members of Congress, who have been among the leaders in that body. One of the latter stated, "I have a keen appreciation of the assistance which you and your Association have been in bringing about the good work. If it had not been for such assistance, it would have been impossible to have accomplished the result, and therefore you are entitled to the credit for the legislation." To our Secretary is due great praise for the efficient work he did in season and out of season to impress upon the people and the Congress the importance of the matter and to further the passage of the bill.

Votes were also passed urging the New York Cotton Exchange to adopt the government grade samples for the standard of the exchange and requesting the Department of Agriculture to take up the subject of standards for staple.

An enjoyable and profitable afternoon was spent in discussing matters of interest to the industry, and in the evening our Association gave a banquet to those attending the conference and addresses were delivered by several distinguished men in public life. It is hoped that similar conferences may be held in the future. Th National and the American Associations are too big and too diversified in interests to think of amalgamation, but annual meetings and conferences of the officers of the associations will certainly bring good results and establish friendly relations and many concurrent lines of policy between all interests. But, as I stated in my address at Portsmouth, and repeated at Washington, the time for resolutions and conferences alone has gone by and what we now need is action that will sincerely attempt to accomplish some of the reforms that have heretofore never got beyond the stage of talk.

BILLS-OF-LADING.

Mention was made at the September meeting of the Association of questions the foreign bankers had raised with reference to the validity of cotton bills issued by our railroads, and a temporary arrangement was made to cover last year's shipments. It is expected that this matter will receive further consideration, and, before the next crop is moved, will be satisfactorily settled so that all interests will be safeguarded.

The Secretary of this Association appeared at the hearing of the committee of the House of Representatives on behalf of the Stevens' bill, which was drawn for the purpose of covering these questions pertaining to bills-of-lading for the purpose of extending the provisions of the common law applying to carriers which were established before the existence of present commercial and transportation methods. The purpose of this bill

in fixing the responsibility of bills-of-lading in addition to obviating the difficulties mentioned above, would also make bills-of-lading valid representatives of the material in transit and as such serve as collateral to a reasonable proportion of the value of such material, so that they would be accepted by banking institutions as collateral security for loans and in this manner be of untold value to mercantile and manufacturing interests of this country by releasing the valuable material in transit from the condition of dead capital to a liquified asset.

After a most thorough investigation of the subject, the bill passed the House of Representatives, but owing to the death of Senator Elkins, who had the matter in charge, in the upper body, this measure has not as yet been taken up by the Senate, but it is expected that the new Congress will enact this bill into law.

COTTON EXCHANGES.

The subject of cotton exchanges in the country and their methods of doing business has attracted a great deal of attention during the past year. A most drastic bill known as the Scott bill, and which, practically speaking, would have closed every exchange in the country, passed the House of Representatives but did not pass the Senate. While all will admit that there are certain abuses of the legitimate functions of the exchanges, such a bill was too radical and too sweeping in its provisions, and I believe would have been disastrous in its effects. It is to be hoped that the rules of the exchanges may be amended so that they will tend to discourage speculation and do away with abuses and thus preserve the exchanges for the legitimate and useful position they were intended to fill in the industry.

THE ASSOCIATION.

In my address at the fall meeting appears the following: "In addition to the many broadening changes developed from time to time as opportunity served, there have been many more fully prepared and forced to lie in abeyance through the lack of resources necessary for their fulfillment. . . . Is it not our duty to most carefully consider the question of increasing the income that we may better carry on the purposes of the Association?"

You will recall that the by-laws state that the annual assessment, fixed by the Board of Government, shall not exceed ten dollars for active members and that the annual assessment for associate members shall be double the sum annually voted for active members. While it has been the custom for some time to make the annual assessments five and ten dollars respectively, I am glad to be able to state to you that after most careful consideration of the subject, the board has decided unanimously this year to make the assessment for active members ten dollars and for associate members twenty dollars. In taking such action it is believed that no hardship would be imposed on any member and felt that even with the advanced dues the members would receive in benefits much more than the money value paid in. The controlling idea, however, was the firm conviction that the Association could not in the future carry on and enlarge its work in the way it should without the added income which will now be available. With this new income it is expected that the Association will go forward with new life and vigor and be of greater service than ever to the members and to the industry.

At the conclusion of the morning session the meeting adjourned to the lawn next to the hall, where Theodore H. Price, of New York, gave an exhibition of the Price-Campbell cotton picking machine. A similar exhibition was given by Mr. Price in Park Square, Boston, in June, 1910, an account of which appeared in our issue of July. Judging by the results of these Boston tests the machine promises to bring about an important development in cotton raising, and we shall all look forward with interest to its work in the fields, with the hope that it may be the means of bringing about that increase in the cotton crop which the world so greatly needs.

The afternoon session began with the reading of the following paper:

Efficient Buying of Raw Material.

WALTER S. WILLIAMS, 93 Broad Street, Boston, Mass.

Poor Richard's admonition "Buy what thou hast no need of and ere long thou wilt sell thy necessities" is replaced today by a more modern maxim reflecting the close competition of our great industries, "Buy efficiently that you may sell with profit."

Buying may be defined as the act of acquiring by the payment of a price or value and efficient buying as the selection of the article acquired so that the transaction will give the greatest possible return for the expended value. This is not synonymous with the purchase of an article selling at the lowest price per unit or the blind purchase of the highest quality without due consideration of its application to the work in hand or its true relative value. In one case it may be true economy to replace a low-priced material by one selling at a higher figure but showing greater money value, while in another the high-priced product may be a needless expense. Again, greater efficiency may consist in the selection of material according to physical and chemical properties, rather than by trade names or brands; in the change to a product shown of higher grade but opposed by foremen because of conservatism or other reasons or in the replacement of unsuitable material by a complete change in process.

The raw material of the cotton mill may be roughly divided into three classes. The first contains those articles which form a part of the finished product, as cotton, dyestuff and the like; second, those which act upon the finished product in some manner but do not appear in the article

as sold and which includes chemicals used in bleaching or similar processes, as acids and alkalies; and third, those which are only indirectly in contact with the finished product, as coal, lubricating oils and all mill supplies having to do with generation or transmission of power, transportation and the like.

As the industry of which this Association is representative expends $250,000,000 annually for cotton alone and another $80,000,000 for other supplies, a saving of only 1 per cent. would mean the addition of $3,300,000 to the profit account.

The average efficiency of purchasing in this country is estimated by different authorities of wide experience as only 60 per cent. or a direct loss to the buyers of 40 per cent. As the average for both cotton and fuel are probably well above this mark, we can class the cotton manufacturers as leaders in the improvement of this condition.

The government, ably seconded by all concerned, has taken the initiative in the improvement of the conditions existing in the cotton market, particularly by establishing the Standard Cotton Grades and preparing reproductions of the same for general distribution. The good work can be continued by united action, looking to the production of a uniformly compressed bale properly covered but with a minimum tare. Such improvements come as a matter of course as soon as the buyers of an article make a determined and united stand. The selection, valuation and purchase of cotton is the work of an expert, a fact early realized by the manufacturer and consequently relegated to some responsible officer or member of the firm. That the choice of other supplies, fuel, oils, chemicals, dyestuffs, would well repay the same expert attention has not been generally understood. This is partly explained by the lower proportionate part which these items play in the total cost of production and partly by the erroneous idea that price was the only criterion, and consequently any one who could figure was qualified to buy. It should be borne in mind that a net saving of 1 per cent. anywhere in the present cost of production immediately adds that amount to the right side of the profit and loss account. If this fact is kept well in mind, the purchaser will have an increased idea of the importance of true efficiency in even the small items of supply, and will realize that he cannot afford to ignore them if he hopes to keep abreast of the close competition of modern business.

Many large users who have given attention to the possibilities of reducing their fuel bills have recognized the scientific basis for purchase of coal as established by the United States Government. The choice of fuel is no longer based on the statements of the selling agent as to its quality or the reputation of the mine or district from which it was shipped, but on quality covered by specifications. The matter is briefly summarized in a paragraph which I quote from a recent government bulletin.

"In the purchase of coal, attention should be given to the character of the furnace equipment and the load; the character of coal best suited to the plant conditions; the number of heat units obtainable for a unit price; the cost of handling the coal and ash; and the possibility of burning the coal without smoke or other objectionable features."

The selection of the best coal for each particular plant and the preparation of specifications for its purchase on a heat unit basis require the services of an expert in the line of work, but once established require only frequent analyses of coal and refuse with proper boiler room control to produce a substantial saving in this department.

A coal giving 14,650 B. t. u. and containing only 5 per cent. ash, 2 per cent. moisture and 0.75 per cent. sulphur would be a more efficient purchase at $3.70 per ton than one showing only 13,950 B. t. u. and containing 9 per cent. ash, 2 per cent. moisture and 1.75 per cent. sulphur at $3.55 per ton. In the latter case 1 1/20 tons, costing $3.73, are required to give heat units contained in one ton of the better fuel, but owing to the higher percentage of impurities and other properties peculiar to these two coals, there will be a loss in efficiency which will make the relative difference greater. There will be a still further loss due to the increased amount of coal and ash to handle and the damage to the grates and setting due to other impurities.

Scientific control is equally possible for all of the great variety of supplies used in our mills and demands first a practical knowledge of the uses and requirements of the articles and second, the same knowledge of the properties and source of supply as well as the actual composition of the material delivered.

As an example of the necessity of efficient buying, let me cite the case of a soda ash recently offered one of our mills. The sample was forwarded to a chemist for analysis and was found to contain large quantities of Glaubers and common salt and only 58 per cent. of sodium carbonate Na_2CO_3. Soda ash is commonly sold at 58 per cent., but this refers to 58 per cent. of Na_2O, which is equivalent to 99.16 per cent. of Na_2CO_3. Under the conditions one would be almost suspicious that an attempt had been made to defraud, and that the dealer stood ready to claim a misunderstanding as to the meaning of 58 per cent. of soda ash in case of discovery. The buyer on the other hand stood to lose about 40 per cent. We have also found people who used sal soda and other crystals in place of soda ash, with very little knowledge of their relative values. Soda ash is a calcined product and usually contains about 97 per cent. of Na_2CO_3. Sal soda crystallizes with ten parts of water and theoretically contains 37 per cent. of Na_2CO_3, the other 63 per cent. being water that is no more valuable than water from any other source. It costs much more, however, and adds to the freight and handling expense. Monohydrate of soda crystals, also offered in the market contain theoretically 14.5 per cent. of water and 85.5 per cent. of Na_2CO_3. Crystal soda found in common use varies in strength between these two extremes. Unfortunately, still further complication arises with this common product, for it is generally sold by one of several arbitrary "tests," which are erroneous enough to give the product the appearance of 99 per cent. purity when it may actually be only 96 per cent., thus representing a loss of 3 per cent. to the manufacturer.

If a chemical valued only at approximately one cent per pound is subject to such manipulation, it is easy to foresee the pitfalls which may be encountered in the purchase of more expensive products.

Efficient buying requires complete records, that shall be both available and reliable, of all the raw material in common use from which may be determined at any time both the average consumption and the stock on hand. With this information the buyer is able to take intelligent advantage of any break in price or to cover against an increase. This record will likewise serve to detect and locate any radical increase in the use of supplies and point to the offending department if unwarranted, but more important still, will determine for the intelligent purchasing agent the suitability of the material for the particular purpose. Records should likewise show all quotations received whether accepted or not and the results of all tests made on samples. Records must be as simple as possible, cost little to keep up and be quickly available. This function of the purchasing department is usually more efficiently managed than the selective. Records, however, are often needlessly voluminous or lacking in important details and sometimes are not understood when made. For greater economy the buyer must be thoroughly familiar with the processes of manufacture and be fitted to decide the probable utility of new products without endless and needles trials. He must be able to command trial when he knows the same will probably be to the advantage of the company, even against prejudice and opposition on the part of workmen and must naturally be in full sympathy with the management. Chemical and engineering laboratories if maintained must be more or less directly under his direction and all results obtained fully reported for record in the purchasing department.

Large concerns have realized to a certain extent the importance of this scientific control of their supplies and are maintaining laboratories, many of which are doing excellent work. The work to be successful must be in the hands of experienced engineers who must not be too closely confined to the routine of the mill, while yet familiar with all its problems and requirements. The smaller plant must depend on outside assistance for this aid in selection and valuation of raw material.

This paper was followed by a talk on workmen's compensation by James A. Lowell, chairman of the Massachusetts commission to investigate this question. Mr. Lowell's remarks showed plainly that he had made a careful investigation of the question of workmen's compensation and his hearers obtained a good general idea of the status of this matter in different countries. He gave an account of the methods adopted in Germany, Norway and Great Britain for workmen's compensation, pointing out the difference between the systems in those countries and in the United States.

The probability of a new law covering this matter, its form and effect were discussed at length and many questions were asked by manufacturers and answered by Mr. Lowell.

Next came a paper on standardization of artificial illumination in cotton mills, by J. S. Codman, Boston:

Standardization of Artificial Illumination in Cotton Mills.

J. S. CODMAN, 93 Broad Street, Boston, Mass.

An inspection of cotton mills in this country, both in New England and elsewhere, will, I think, show an exceedingly wide diversity in the methods employed in obtaining artificial illumination and, in speaking of cotton mills, I am referring solely to those mills which confine themselves principally to the manufacture of yarn and cloth. If the nature of the work in these different mills differed very greatly there would, of course, be an obvious reason why the methods of artificial illumination should also differ, but, as a matter of fact, the conditions in these mills are so similar that there would seem to be very little reason to warrant such great variety in methods of illumination.

In my opinion the principal reason why such conditions exist in a thoroughly well-standardized industry, such as the cotton industry, is due to the fact that artificial illumination is not, as a rule, given sufficient consideration. In the nature of things this condition is unavoidable as long as every mill manager is in the position of having to decide these matters for himself, since he has neither the time nor the individual knowledge sufficient to make an exhaustive study of the subject. However, what the individual mill manager cannot do, mill managers collectively might and I believe should do. An Association such as this, for example, might very well afford to make a thorough investigation of the subject and report to its members. In all probability there is some best way of furnishing artificial illumination in a cotton mill and the cooperation of the members of this Association might enable each member to ascertain what this method is.

It is my intention in this paper to suggest to The National Association of Cotton Manufacturers that they make an effort to reach a definite conclusion in regard to the lighting of cotton mills and I would suggest that this could best be done by formulating the requirements of good illumination and following this with a discussion of how these requirements can best be met.

Having made this suggestion it is the further subject of this paper to do a little pioneer work in the desired direction by making a statement of what in my opinion are some of these requirements, and how they can be met, in order thereby to form a basis for a discussion of the subject. In undertaking this work it is necessary to recognize at the outset that a cotton mill, manufacturing

yarn and cloth from the raw cotton, has to deal with a number of problems of artificial illumination. For example, it is very evident that the lighting of looms and the lighting of spinning frames are two totally different problems, since roughly speaking the lighting of looms means the lighting of a horizontal surface, while the lighting of spinning frames is, in the main, a question of lighting vertical surfaces. It would be difficult, therefore, to find two lighting problems which were so radically different in their nature.

Although I have made a considerable study of a number of these problems, I have come to the

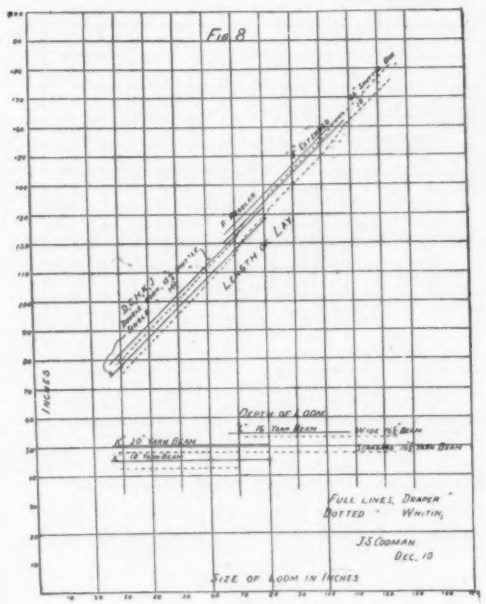


FIG. 8.

conclusion that in this paper it would be better not to undertake too much, but to confine myself to one problem and ascertain if there are reasonable prospects of reaching definite conclusions. I have decided, therefore, to place before you a study of the lighting of cotton looms as, on the whole, the most important problem in the lighting of cotton mills, and I have further decided to confine this study entirely to the lighting of plain weaving looms; first, because this greatly simplifies the problem and, secondly, because by far the greater number of looms in operation are of this type. In this discussion, therefore, plain weaving looms will alone be considered, and by a plain weaving loom is meant one with only two harnesses, and without dobby head, box motion or other complication and of which the arch is a single narrow piece of metal. With such looms there are not many parts of the machine which are likely to cast awkward shadows.

In closing this introduction to the subject, I wish to state that I am more than anxious to obtain the criticism of mill engineers and practical cotton men in regard to my statements of fact, as well as to my methods and conclusions.

STANDARD LOOM DIMENSIONS.

In order to ascertain what may be considered standard loom dimensions for the purpose of making a study of the illumination, I have investigated the dimensions of looms of different manufacture, and have then assumed certain dimensions as standard. Generally speaking, these dimensions are maximum (disregarding unusual extremes) for the reason that if the lighting installatoin is designed using the larger dimensions it will also be satisfactory for an installation having the smaller dimensions while the contrary might not be the case. These dimensions are discussed below in detail in order that the probable amount of variation from the standard in particular cases may be appreciated.

The overall dimensions of a loom are determined by the length of the lay which gives the

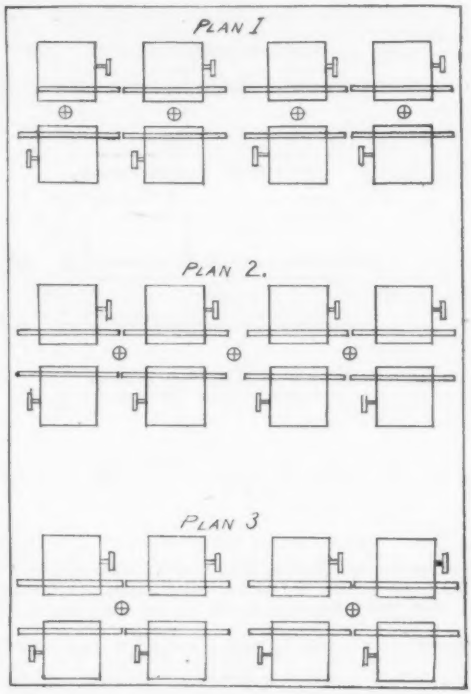


FIG. 9.

extreme width; and the distance from the breast beam to the outside of the full warp beam, which dimension gives the depth. The length of the lay increases rapidly with the increase in the width of the cloth to be woven, that is, with the increase in the rated size of the loom; but the depth of the loom varies but little.

Figure 8 gives these relations in diagramatic form, the data being obtained from the dimensions of the Draper and Whitin looms, and an inspection of this diagram will show that for a given size of loom the overall dimensions vary within

decidedly narrow limits. It is possible, therefore, in studying the lighting question to assume formulae for all sizes of loom, which formulae will give with sufficient exactness the relation between loom size and length of lay, between loom size and loom depth, and between loom size and floor space occupied, this last being the product of length of lay and loom depth.

An investigation of the Crompton and Knowles "Providence" cotton loom, the Stafford "Ideal" loom and the "New Standard" and "Print Cloth" looms of the Mason Machine Works, shows that for these looms the above dimensions are included within the extremes shown in the diagram.

TABLE I.

Manufacturer	Models	Sizes and Constant
Draper	(D, E, H and K) Single fork, 14½-in. shuttle.	26 to 80—48
Draper	(H) double fork, 15¾-in. shuttle.	26 to 80—52½
Draper	(F) Regular Type.	66 to 108—54⅛
Draper	(F) Extended Type.	66 to 108—56¼
Whitin	18-in. shuttle box.	28 to 70—46
Whitin	23-in. shuttle box.	28 to 70—51
Whitin	18-in. shuttle box.	72—48
Whitin	23-in. shuttle box.	72—53
Whitin	18-in. shuttle box.	74 to 81—49
Whitin	23-in. shuttle box.	74 to 81—54
Whitin	18-in. shuttle box.	82 to 101—50
Whitin	23-in. shuttle box.	82 to 101—55
Whitin	18-in. shuttle box.	107—51
Whitin	23-in. shuttle box.	107—56

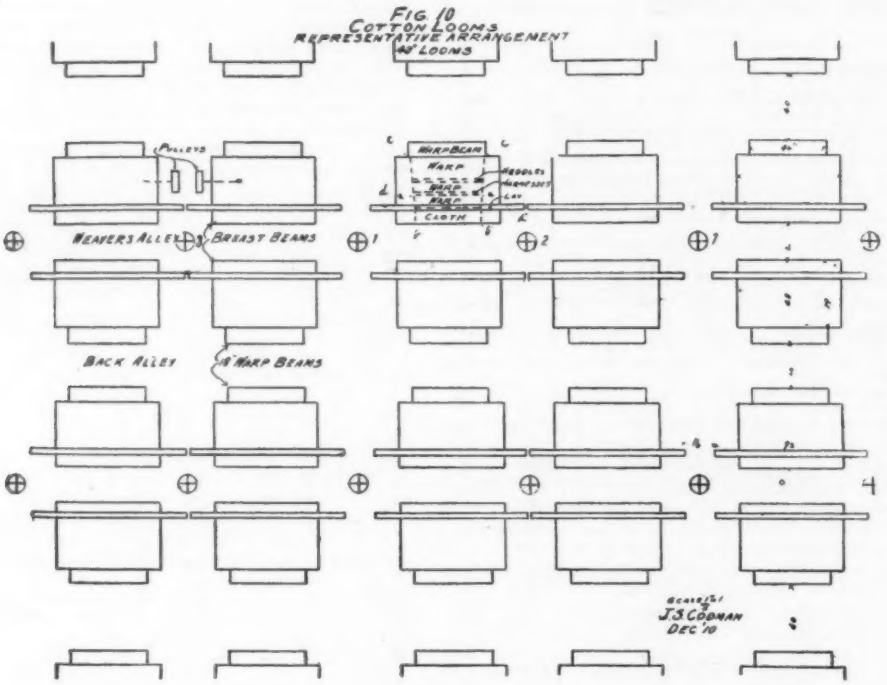


FIG. 10.

FORMULAE FOR LENGTH OF LAY AND DEPTH.

The length of lay is different for different makes of machine and is also dependent on the size of the shuttle box and the number of filler forks, but with these conditions fixed the length of lay for different loom sizes can be expressed by a simple formula of the following type:—

$$L = S + K,$$

in which L is the length of lay in inches, S is the rated size of loom in inches and K a constant. In the following table the constant for this formula is given for different makes or models. These conditions represent maximum and minimum values for the constant K, for each type of loom.

Whitin ..... 108 & 124—52
18-in. shuttle box.
Whitin ..... 108 & 124—57
23-in. shuttle box.
Mason (New Standard) ..... 30 to 62—45½
14½-in. shuttle.
Mason (Print Cloth) ..... 24 to 60—47½
Stafford (Ideal) ..... 28 to 72—49½
14½-in. shuttle.
Stafford ..... 28 to 72—52½
16-in. shuttle.

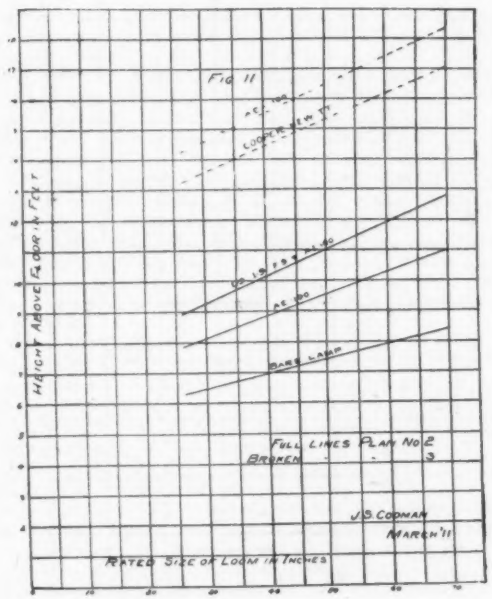


FIG. 11.

Crompton & Knowles (Providence
Plain) ..... 30 to 50—47
20½-in. shuttle box.

In the drawing (Fig. 10) showing representative conditions for 40-in. looms, the length of lay is 92 in., which corresponds to a value of 52 for the constant K, and this may be considered a representative value for all sizes up to 70 in., disregarding the Draper type F looms in sizes from 66 to 70 in. Beyond 70 in., a more representative value for K is 55. Assuming these constants, therefore, the formulae for the length of lay are as follows:—

26 to 70-in. looms ..... $L = S + 52$
72 to 124-in. looms ..... $L = S + 55$

The depth of loom differs with the manufacture and model and also depends on the diameter of the warp beam. Fig. 8 shows the relation between this dimension and the rated size for Draper and Whitin looms, and practically this dimension for other makes lies between the extremes shown. The depth of the wide Whitin looms has been taken as representative, and the formulae, therefore, are as follows:—

26 to 70-in. looms ..... $D = 48$
72 to 124-in. looms ..... $D = 53$

where D is the depth of the loom in inches.

AREA OF FLOOR SPACE COVERED BY LOOMS.

As previously pointed out the area of the rectangular floor space taken by a loom is the product of the length of the lay and the depth. The formulae for the area are, therefore, as follows, where A equals the area in square feet.

For 28 to 70-in. looms,

$$A = [(S + 52) \times 48] \div 144 = 0.33\,S + 17$$

For 72 to 124-in. looms.

$$A = [(S + 55) \times 53] \div 144 = 0.37 + 20$$

STANDARD WEAVE SHED DIMENSIONS.

Fig. 10 is a plan of a weave shed equipped with 40-in. looms, and shows conditions assumed standard in this paper. The looms are arranged in groups of four, which arrangement gives greater

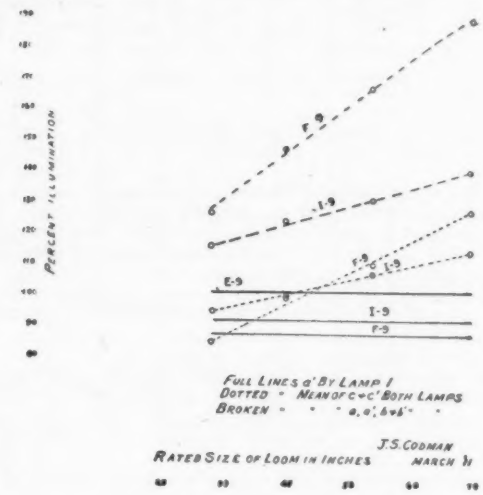


FIG. 12.

spacing between looms than a grouping of six or eight looms to a group and consequently should be chosen for the lighting study for the same reason that the maximum dimensions of looms were chosen. The alley dimensions are given below, together with the variations likely to be found in actual installations. The back alleys are alternately wide and narrow, the wide alleys containing the supporting pillars.

Dimensions.	Assumed.	Usual.
Weaver's alley	21 in.	18 to 21 in.
Back alley with posts	40 in.	37 to 42 in.
Back alley without posts ...	26 in.	22 to 30 in.
Cross alley	16 in.	12 to 18 in

The clearance between the lays of looms in the same group is one inch, which dimension is practically standard.

From the dimensions of alleys given above and by means of the formulae already given for the length of lay and depth of loom for different rated sizes, formulae can also be obtained for the area of floor space per loom including the alleys. [Mr. Codman then gives methods of obtaining the mathematical formulae which may be obtained in the pamphlet form.]

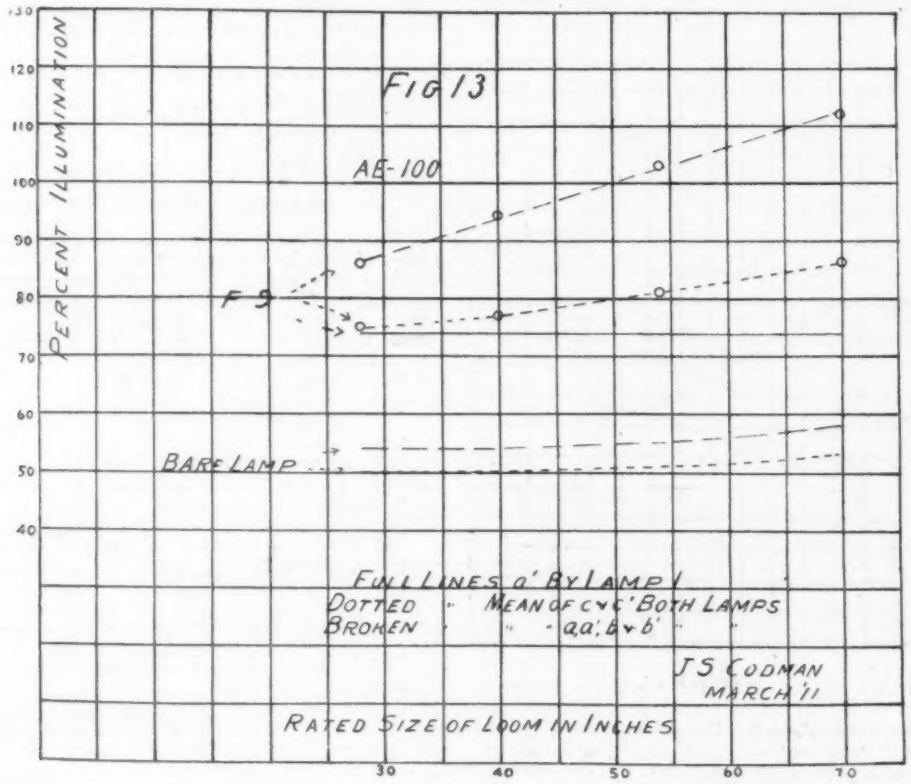


FIG. 13.

LOCATION OF LIGHT SOURCES.

The first question to decide in regard to the lighting of looms is the proper location of the light sources, as this location determines the direction of the light falling on the looms, an all important matter. If the light does not have the proper direction, awkward shadows of parts of the machinery and the weaver's body are bound to exist. This is true no matter what the nature of the illuminant used, since light always travels in straight lines and cannot get around corners. Of course, in the case of the light sources with a large radiating surface, shadows are not quite so bad; but, practically speaking, there is no material difference between different illuminants in this respect. It is also true that awkward shadows are bound to exist, if the light does not have the proper direction, no matter how much light is supplied. The greater the amount of light supplied the more intense are the shadows.

With plain weaving looms, that is with looms having only two harnesses and of which the arch is a single piece of metal as already stated, the most annoying shadow which will be obtained if the sources of light are not correctly placed, is the shadow of the handrail on the warp toward the front of the loom. If this shadow exists, the point of passage of the warp thread through the dents of the reed is plunged in comparative darkness and it becomes difficult for the weaver to draw the threads through the reed as he must whenever a thread breaks. This shadow will always exist if the preponderance of light comes from the rear of the loom and, therefore, in order to avoid it, it is necessary to place the light sources at the front of the looms, that is, in all the weavers' alleys and in actual practice this is usually done. It is not necessary with plain weaving looms to place light sources at the rear of the looms, if those in the weavers' alleys are placed high enough to distribute the light in a proper manner, as in such case the back, as well as the

front of each loom, will be illuminated and the shadow of the arch on the back of the loom will be too narrow to be of consequence.

The only other shadow which is likely to be objectionable, if care is not taken to avoid it, is the shadow of the weaver's body. With the arrangement shown in Plan 1, Fig. 9, an arrangement very often seen, where the light sources are placed directly between each pair of looms, this shadow is sure to be objectionable. In performing the operation of picking up a thread, the weaver reaches from the front part of the loom to the rear with his arms under the arch and over the harnesses and then draws the thread through the harnesses and reed, his position (if a right-handed worker) being with the left shoulder forward, left hand over the harness and the right hand in front holding the hook. With the light source directly in front of the loom, as shown in Plan 1, the weaver can avoid his own shadow only when working well to the left of the center of the loom, in which case the light comes over his right shoulder. When at all to the right of the center of the loom the weaver will, on account of his position with the left shoulder forward, cast the shadow of his body on the part of the loom he wishes most particularly to see. Of course, if the weaver is a left-handed worker the condition is reversed.

The above statement in regard to the shadow of the weaver's body applies not only to the arrangement shown in Plan 1, Fig. 9, but is equally true of any arrangement which brings any of the lamps directly between looms in the manner of Plan 1. For example, if the lamps are arranged as in Plan 1, but with every other lamp omitted, it is plain that every other pair of looms will be similarly situated with reference to the light sources, as are the looms in Plan 1. Further, with any arrangement of light sources in the weaver's alleys in which the light sources are so spaced that they are not symmetrical with respect to the looms, some of them are sure to come in this undesirable position, and there will be a certain number of looms, therefore, which will be unsatisfactorily illuminated for the reasons above given.

If, however, the lamps are arranged symmetrically with regard to the looms in the manner shown in Plan 2 or Plan 3, this objectionable shadow of the weaver's body will be avoided. With either of these arrangements the weaver will receive the light over both shoulders, or, if obliged to shade one of the light sources when drawing the thread through the harness and reed he will still receive light from the other one. With these arrangements, however, good results cannot be obtained unless considerable care is taken to place the light sources at the correct height and to choose those having a correct light distribution, in order that the light may be properly directed to the working parts of the loom. For example, when incandescent lamps are used not equipped with reflectors, far too much light will be thrown above and near the horizontal; while if reflectors are used without proper consideration of the manner in which they modify the distribution of the light, the result is nearly certain to be a useless concentration of light directly under the lamp and an unsatisfactory illumination over important parts of the looms.

STATEMENT OF GENERAL PROBLEM.

The problem of how to light plain weaving looms may now, I think, be stated as follows:—

First, the light sources should be placed in the weaver's alleys in order that the preponderance of light may come from the front, and they should be so spaced as to avoid any of them coming between looms as in Plan 1. Secondly, the light sources should be hung at such a height and have such a characteristic light distribution that the illumination due to the light source at the left of the weaver shall be as nearly as possible the same as the illumination due to the light source at the right of the weaver, so that when the light from one lamp is blocked by the weaver's body not more than one-half the direct light will be cut off.

In regard to the choice of either Plan 2 or Plan 3 or some plan with even wider spacing, there are certain economical advantages in wide spacing which should control the decision of the matter, provided satisfactory illumination is not thereby sacrificed. Wide spacing results in the use of a relatively small number of high candle power lamps which, compared with a larger number of low candle lamps, is more economical:—

First, because the cost of wiring to outlets is less.

Second, because the total cost of the lamps themselves is usually less.

Third, because the cost of renewal parts of lamps, on account of the smaller number of lamps, is usually less.

Fourth, because the labor of keeping the lamps in order, including cleaning, is less, and results in greater attention being given to them, and consequently, in better illumination.

There is, however, one disadvantage in using a few large light sources rather than a number of small ones, even when the illumination in the two cases is equally satisfactory, namely: that the failure of a light source is a more serious matter. This disadvantage can, however, be avoided if necessary by making each light source of a multiple character, that is by having a number of lamps at each outlet, bunched together on a fixture or cluster of some kind. This, however, will of course do away partly or wholly with the second, third and fourth advantages mentioned above.

The conclusion is reached then, that we should use as few light sources as is compatible with good illumination and the question arises just how far can we go in this direction. It is evident that if we could light the weave shed by a single light in the center it would be by far the most economical thing to do, but from the standpoint of good illumination, it would be hopelessly unsatisfactory. It has already been shown that the light sources should be placed in all the weavers' alleys, and it should be noted that this practically fixes the spacing in the direction at right angles to the alleys to 12 1/2 ft., which is the distance between weavers' alleys on centers. The only other question to decide is the spacing in the direction parallel to the alleys. If this spacing is as great or greater than in Plan 3, it will be necessary to place

the light sources at a very considerable height in order that the illumination may be reasonably uniform, and this, in many cases, it may be impossible to do on account of the limitation of the ceiling height. Further than this, if the lamps are placed very high, not only is the light spread widely up and down the weavers' alleys, but it tends to spread out to an equal extent at right angles to these alleys and causes light to fall upon the looms in the wrong direction, namely from the rear, and thus introduce awkward shadows. It is finally concluded that either Plan 2 or Plan 3 should be adopted, and the remainder of this paper consists of a study of these two plans.

STUDY OF PLANS 2 AND 3.

Referring again to Fig. 10, it will be seen that on one of the looms shown, the relative positions of parts of the looms and portions of the material are indicated. In this diagram the lay is in a forward position and, consequently, the edge of the cloth appears directly under it. The width of the material is also indicated and it appears that it is slightly wider toward the back of the loom. However, for all practical purposes in regard to illumination, the material may be considered as having a width at all points equal to the rated size of the loom. I have already pointed out that the work should receive illumination from the left and right equally, and this applies at least to all points of the material on the loom as far back from the front as the line aa′, which represents the line of intersection of the warp and the harness front. Back of this line this equality of illumination from the two light sources is not of quite so much consequence; and at the extreme back it is of no consequence at all since the weaver, in order to reach those points, goes to the back of the loom, in which case he does not cast a shadow of his body. The back of the loom should, however, be well illuminated, although the intensity there need not be so great as toward the front, and the same thing may be said of those parts of the loom outside the width o the materifal. In particular the shuttle boxes at the ends of the lays should receive a good light, especially when the machine is not equipped with an automatic shuttle changer. In the latter case it is important that the weaver should be able to see easily how much thread remains upon the shuttle so that he may be ready at the proper time to replace the empty shuttle by a full one.

The writer has made a number of investigations of different light units, assuming the arrangements of Plans 2 and 3, with looms from 26 to 70 in. in rated size, and the results are shown in Figs. 11, 12 and 13. Since, however, an account of this investigation is largely technical illuminating engineering it has been relegated to the appendix of this paper.

The light units investigated in the case of Plan 2 consisted of single clear bulb tungsten lamps equipped with various types of reflector, the calculations being made from the results of photometric tests of various combinations. The reference to these tests will be found in the appendix.

For convenience in comparison 100-watt Mazda lamps, 80 mean horizontal candle power, were assumed in all cases, but it does not follow that 100-watt lamps are recommended for use. The size of the lamp is a question of average intensity of the illumination required, and this will vary with the character and color of the material to be woven and will be considered later. Further than this, as these same types of reflector are furnished for larger and smaller lamps than 100-watt and are designed to give the same light distribution, it can be assumed that these smaller lamps, if used, should be placed at the same height as the 100-watt lamps and that the illumination values will be proportionate to the watts consumed.

The reflectors investigated consisted of three clear glass prismatic reflectors known as "extensive," "intensive" and "focusing" respectively, and two opaque steel reflectors, "extensive" and "intensive."

Fig. 11 is a diagram from which the correct mounting height above the floor of each unit investigated can be ascertained for any rated size of loom from 26 to 70 in. The height of units used with Plan 2 are shown by the full lines and those with Plan 3 by broken lines.

Figs. 12 and 13 show a comparison of the illuminating results obtained by the different units when used with Plan 2, and show for the different units the relation between the rated size of loom and,—

First, the illumination at point, a′, resulting from the lamp in position 1.

Second, the mean of the values of the illumination at points, c and c′, resulting from both lamps.

Third, the mean of the values of the illumination at points, a, a′, b and b′, resulting from both lamps.

In this comparison the absolute values of the illumination are not important, but it is desired to see clearly the amount of variation in illumination values when different light units are used. For this reason, in Fig. 12 the values with the extensive (E9) glass reflector are in all cases platted as 100 per cent., and the values of the other units are given in per cent. of the extensive.

Time does not permit an exhaustive study of these comparisons to be made here, but it will be well to call attention to the very great difference in the amount of illumination obtained from different units, even though the same lamp is used in all cases. Comparing the three glass reflectors, it will be noticed from Fig. 11 that they should all be placed at the same height, which varies with size of loom from 9 ft. to nearly 13 ft. above the floor, but it will be seen from Fig. 12 that the illumination of the looms will be very different in character with the different units. The illumination at the point a′ due to the unit in position No. 1 will be greater with the extensive type of reflector for all sizes of loom, but the difference is not very great. On the other hand, the mean value of the illumination of the points a, a′, b and b′ is considerably the greatest with the focussing type of reflector (F9), and this is especially true in the case of the larger looms. For example, with a 70-in. loom this type of reflector gives a mean illumination value of these points about 90 per cent. greater than can be obtained with the

extensive type. The importance of choosing the correct reflector, therefore, is apparent.

Without going into this comparison in further detail the writer believes that of these three types of reflector, the focussing is the best suited to the work especially when the looms are of large size and providing, and this is important, that the height of the ceiling permits the hanging of the lamps at the proper height, as shown in Fig. 11.

Fig. 13 shows a comparison of illumination results obtained by the most suitable of the glass reflectors, namely, the focussing type (F-9); the most suitable of the steel reflectors, that is the extensive type (AE-100), and the bare lamp. It will be seen that the bare lamp practically results in direct illumination of only one-half that which can be obtained from the extensive steel reflector. A bare lamp, therefore, is utterly unsuitable for the purpose on account of its low efficiency. In addition also it has to be hung low, that is, from 6 ft. to 8 1/2 ft. above the floor, see Fig. 11, and in such case the naked filament is intolerably glaring.

Comparing the steel reflector (AE-100) with the glass (F9), it is found that the steel reflector is very considerably superior to the glass in the amount of illumination which will be obtained at the important point, a', when illuminated by the lamp in position No. 1. It is also distinctly superior in its illumination of the back of the loom as determined by the mean value of illumination at points c and c'; and is superior also at the front of the loom, as determined by the mean value of the illumination at points a, a, b and b', for all sizes of loom under 50-in., but is somewhat inferior for looms of larger size.

As compared with the glass reflector, the steel extensive type has a decided advantage, therefore, in the direct illumination of the looms and is to be preferred unless the upward light from the glass reflector is returned to the looms by reflection from the walls and ceilings in sufficient quantities to offset the difference in illumination. This is not, however, to be expected. A test which the writer made in a typical weave shed showed that the amount of reflection from walls and ceiling in a weave shed was very small.

Another advantage which the extensive steel reflector (AE-100) has over the glass reflectors is the less height at which it should be hung, see Fig. 11. The somewhat lower mounting height of the steel reflector is an advantage because it enables a better illumination to be obtained on the reed by reducing the length of the shadow on the reed from the reed cap.

In the case of Plan No. 3, it will be seen from Fig. 11 that the two units investigated should both properly be placed at a very considerable height, the Cooper-Hewitt lamp having somewhat the advantage in this respect. However, even the Cooper-Hewitt lamp cannot be placed at the best height with ordinary ceilings and large size looms.

CANDLE POWER OF LAMPS WITH PLAN NO. 2.

The next step is to determine the candle power of lamps which should be used with Plan No. 2 and it has already been stated that this depends not only upon the loom size, but also upon the nature of the material to be woven. Investigation seems to show that for coarse gray goods and 40-in. plain weaving looms, 40watt tungsten lamps are satisfactory for Plan 2 if properly installed and equipped. By means of formula 5, page 10, it is found that for the 40-in. loom the floor space per loom is 52.8 sq. ft. and since with Plan 2 there is one lamp for two looms, the watts per square foot with 40-watt lamps is 0.38. Assuming now this same figure for the watts per square foot in the case of other sizes of loom and calculating the floor space per loom by the same formula, Table 2 below is obtained. This table shows the floor space of the loom and the required watts in the lamps to give the same consumption per square foot in all cases, namely, 0.38.

TABLE 2.

Loom Size.	Area per Loom.	Watts per Lamps.
28	46.6	35
40	52.8	40
54	60.1	45.5
70	68.4	52

In the case of tungsten lamps, with Plan 2, it is recommended that 40-watt lamps be used for looms up to and including the 50-in. size and that 60-watt lamps be used for the larger sizes. The above recommendation applies to coarse gray goods and consequently represents the minimum wattage of lamps to use. With fine dark goods considerably higher wattage may be necessary, but it is not often that larger lamps than 100-watt will be necessary with this arrangement.

It should be stated, however, that this recommendation assumes a distinctly higher standard of illumination than has been obtained in the past prior to the advent of modern lamps of high efficiency. With the old carbon incandescent lamps, it has been common practice to use only 28 watts per loom with 40-in. looms and the writer has been in mills that were using only 14 watts per loom for 40-in. looms, and this with lamps unaided by reflectors of any kind, whereas the above recommendation calls for 20 watts per loom with tungsten lamps.

CANDLE POWER OF LAMPS WITH PLAN NO. 3.

It is clear that if tungsten lamps are used with this plan the wattage of the lamps should be at least double that of Plan 2, that is, with gray goods tungsten lamps should run from 80 to 120 watts. However, a lower standard of illumination is often considered satisfactory and, therefore, 60-watt lamps might be used with the smaller sizes of loom and with coarse goods. Even with fine dark goods it is seldom that lamps of larger size than 150-watt are necessary.

HIGH POWER VERSUS LOW POWER LAMPS.

Referring once again to the question of using a large number of low power lamps, or a small number of high power lamps, it appears from above discussion that if we are going to get satisfactory illumination the spacing should not be greater than is shown in Plan 3; and since with this spacing it will hardly ever be necessary to use more than 150 watts per outlet, it is clear that

the lighting of weave sheds is one best accomplished by a considerable number of comparatively low power lamps. It seems to the writer, therefore, that the use of larger units, such as arc lamps and the big tungsten lamps consuming 250 watts or more is not good practice. It is, of course, true that in many cases such installations will give satisfaction as compared with the installations which they supplant, but it is the writer's opinion that they can never be as satisfactory as a well designed installatio using a larger number of smaller lamps.

CONCLUSION.

The above discussion is merely an attempt to show the possibilities of the application of scientific methods to the problem of artificially lighting cotton mills, and its value will depend largely on the extent to which it is subjected to criticism, and on the attitude of this Association toward the question discussed. I have already stated my belief that this Association might with advantage take up this question of artificial lighting in order to help its members, and I would suggest that perhaps this might best be done through a committee formed wholly, or in the major part, of active members. The associate members of the Association interested in the subject of illumination would, I feel sure, be very glad when called upon to assist such a committee in any way that they might be able.

A precedent has already been set for a committee of this kind since the National Manufacturers' Association recently appointed a committee on Heating, Lighting and Ventilation. It is my own opinion, however, that this last mentioned committee has too large a question to deal with, and I believe the lighting question alone would warrant all the time which a single committee could afford.

[An Appendix to this paper contains formulae and tables of interest and reference value to students of this problem. It may be obtained in pamphlet form from Mr. Codman.]

W. W. Crosby discussed Mr. Codman's paper at some length and heartily approved the plan of appointing a committee to investigate the matter of illumination and endeavor to ascertain if there was not some standard which could be arrived at to produce the best results. Upon motion it was voted that such committee be appointed and the chair will announce its membership later.

The next feature on the program was the reading of the following paper:

The Production of Cotton in the Hawaiian Islands.

E. C. SMITH, P. O. Box 468, Honolulu, Hawaii.

The production of cane sugar is the main industry of the country. The cane flourishes best in tropical regions, and the industry has been gradually developed during the last forty years and today it represents a capital investment of about $150,000,000. It gives a good and sure return for the capital invested, and consequently has gradually consumed all the suitable available land.

Such lands as are suitable for the growing of sugar cane, pineapples, rice or bananas at this date cannot be thought of for the production of cotton, as they all furnish excellent returns to the investors and are regarded as very safe propositions, so that the growing of cotton, the last introduced crop, has to depend for its establishment on such lands as have hitherto been regarded as waste or ranch lands.

This, however, must not be regarded as the first attempt at the introduction of cotton growing in the Hawaiian Islands, for as early as 1862, one lot of 600 pounds of Hawaiian grown cotton was shipped to Boston, and each year following up to 1874 inclusive, shipments of cotton were exported.

The largest shipment any one year was 22,289 pounds. This found an unfavorable market; the growing of cotton ceased and for many years it looked as though it had received its death blow. In 1898 an attempt was made to revive it but without success.

Many specimens of the Peruvian tree cotton (introduced nearly fifty years ago) are found growing strong and luxuriant under very arid conditions. These have been growing without care among other trees, resisting the severe drought and yielding large quantities of cotton for more than forty years. Single specimens of these at times are found reaching some twenty feet across the head, the trunk about four inches in diameter.

After seeing these things, and fully investigating the matter together with a few friends, the idea took root that there was a possibility of a good industry in the islands, second only to the sugar industry and our efforts have been to try and get people interested in the growing of cotton.

Mr. E. W. Jordan, of Honolulu, imported a little seed of the Caravonica tree cotton from Dr. D. Tomatis of Cairnes, Queensland, Australia, and distributed it among some friends, and today this is the type of tree cotton that is generally planted in the islands.

The United States Experimental Station have taken the matter up and are doing very good work, having made experiments with many varieties of cotton, such as the Chinese fire cotton, the American Upland, several types of Sea Island, the Egyptian and the Caravonica tree cotton. In addition to this, we have had the advantage of their cooperation in actual work and in a free distribution of good seed.

Their experiments have been mainly to determine the best kind of seed, suitable soil, elevation, fertilizers; the best method of propagation; the number of years a plant can continue to yield without any deterioration and the best season and method to prune.

Their experiments have furnished splendid results, and at this date the Caravonica wool stands first, with Sea Island second in supremacy, although each variety furnishes some promise.

At this date, there are about 750 acres planted to cotton in these islands. The planting is being

done pretty generally on the whole group. Eight-tenths of the planting done has been with the Caravonica wool, and the balance to Sea Island. None of the other varieties so far have been taken up in a commercial way.

The Sea Island flourishes and bolls at a much greater altitude than the Caravonica tree cotton. It also requires more moisture to enable it to yield the best results. It grows to a height of from four to seven feet, and so far its yields have varied all the way from 100 pounds to 700 pounds of lint per acre.

There is no doubt that these small yields are brought about largely on account of condition. It has been either too dry, too much exposure to the wind, or unsuitable soil, but in every instance where the lint has been under expert test, it has proved to be very long, strong and silky, and it is fully expected that this is going to prove a very profitable crop in many locations, especially where we have it both warm and moist during the months of April and May. There should be some eight to sixteen tons of this very choice lint to market during the year 1911.

The Caravonica tree cotton is very prolific under favorable conditions, but past planting like that of the Sea Island, have given very varied results, its yield of lint per acre being all the way from nothing up to two thousand pounds. It is very sensitive to a cool, moist atmosphere, this causing the squares to drop and in their place a great abundance of wood and foliage is put on.

The tree grows to a height of about ten feet, makes about the same spread, and at times from 900 to 1,000 bolls have been counted on a single specimen; i. e., bolls in formation, and at all stages up to mature open bolls. Also, odd trees yield as much as thirteen or fourteen pounds of seed cotton in a year. The lint from this is of good length, about one and one-half inches, also uniform, strong and resilient, and these traits can be maintained almost absolute.

This being a tree cotton and perennial, makes it possible to work all the trees over as desired to one or two specimens for this purpose.

The extra large yields of this cotton which have been procured only go to show the possibility rather than the probable result from this tree cotton, but it is beyond any question of doubt that the tree cotton can out-yield any other variety where all conditions are favorable.

The height of ten feet would make it appear difficult to gather. This, however, is more apparent than real, for as the bolls mature, the weight of full bolls gradually bear the branches down until most of them are at convenient height. A judicious use of the pruning knife also does much to control this apparent disadvantage.

The tree is a great drought resister, very prolific. It stands up well and supports its bolls, so that no dirt or very few bits of leaves, if any, get mixed with the lint. The bolls are large and open up well. It flourishes best very near the seashore, on light or sandy soil of broken coral formation on a south slope where the climate is very dry and warm.

Thursday morning's session began with the reading of the following paper:

Arbitration on Cancellation of Orders.

R. M. MILLER, Jr., Charlotte, N. C.

The cancellation of contracts is like an insidious disease, uncertain as to when and where it will break out. A complete or even temporary cure, therefore, is difficult, yet some suggestions may be made whereby, in case of eruption, it may be quarantined and prevented from becoming contagious or possibly epidemic.

We are all familiar with the old saying that "a burnt child dreads the fire," and reflecting upon this experience, I have some decided convictions on the cancellation of contracts, and should my conclusions seem severe, no personal affront is intended.

What is a contract and how many of us can define it within the strict meaning and interpretation of the law?

Blackstone says "it is an agreement of two or more persons upon a sufficient consideration or cause, to do or to abstain from doing some act—an agreement in which a party undertakes to do or not to do a particular thing—a formal bargain, a compact." This we may term a legal or technical definition, but a practical interpretation is given by another authority, who says that "the contract dates back to a statute of English origin known as the statute of Frauds and Perjuries, which provides that no agreement or contract for the sale of merchandise can be enforced when the amount involved is in excess of fifty dollars—unless there has been a partial delivery and acceptance or some memorandum in writing made and signed by the party purchasing." There is, however, one exception to this rule given by the same authority, which is, that when an order is given for goods to be made especially to order, then no delivery or acceptance or signed memorandum is necessary.

How many of our outstanding contracts comply with the law as thus interpreted?

Our industry seems to be beset with technicalities on every hand, and one of the greatest sources of the cancellation of orders arises from a misunderstanding of the legal relationship between the buyer, seller, commission merchant or agent and the mill.

The agent as such has no authority in law to consent to the cancellation of an order or contract. This custom, however, has been allowed to go unchallenged until at times the agent assumes the absolute authority and perogative of both agent and mill, dictating its policy and allowing cancellation of contracts without the knowledge or consent of the mill.

Many agents assume authority without any corresponding liability, which is an error in law.

An authority on this point says that it seems to be the belief among many commission houses or agents that when they advertise themselves as "selling agents or sole agents" that by so doing they are relieved from any and further responsibility to the buyer—such is not true—but to the contrary, are liable to the purchaser, as principal,

unless they fully disclose, in each instance, the name of the mill.

A contract in general, in order to be binding, as well as effective, must be fair to both buyer and seller. Such a contract, we think, has been worked out in the "uniform sales note" promulgated by the joint efforts of the committee from this Association and The American Cotton Manufacturers' Association, fully approved and concurred in by a committee of commission merchants, converters and others which, if universally adopted, would eliminate many of the evils now existing in the trade.

As manufacturers, we lose thousands of dollars by these iniquitous methods, and the custom has grown to such an extent that many now call it a "trick of the trade."

The methods adopted by some buyers to cancel their contracts are disreputable and at times dishonorable, often carried to such extremes, in their efforts to hedge a loss or save a dollar, that, if the facts were submitted to a jury of their peers, the verdict would be "guilty and without recommendation to mercy."

When we accept an order, as manufacturers, we do so in good faith and consequently have a right to feel that the contract will be fully protected regardless of the fluctuations of the market.

When we buy our raw material for spot or future shipment, we cannot cancel an order, because, forsooth, there is a decline in the market, but we accept conditions as they exist, assume our liability, receive our cotton and pay for it.

What a reign of chaos would exist, both in the commercial and financial world, if actual cotton commitments were subject to cancellation on a decline or advance of a few points in the future contract market; the volume of business transacted, amounting to millions of dollars daily, would create such an uneasiness in finances, that a panic would be precipitated at any moment, yet on a smaller scale only, these conditions are prevalent today in the cloth and yarn trade.

Our industry has sustained enormous losses on advancing markets by making good our end of the contract, when, in many instances, on the day of shipment, sales of the same goods could have been made at advances from 25 to 33 1/3 per cent. over the contract price.

Again we suffer when conditions change and we have a declining market, by contracts being cancelled and deliveries being postponed and in many cases actually repudiated, and if we insist upon compliance, we are threatened with bankruptcy of the buyer and all kinds of direful consequences.

By such methobds of trading, it is self-evident that the seller has no chance to win and the buyer no chance to lose, such a condition is contrary to fair dealing and common honesty. If business honor and integrity is at a discount in our commercial life, then the law should be invoked for our protection and the punishment meted out should be so severe that no guilty one should escape.

Contracts are cancelled and deliveries postponed indefinitely during periods of depression and declining markets on the merest pretext and technicality, and instances are known of total cancellations of large commitments when the date of shipment was just one day late on a delivery specified six to eight months in advance, and cancellations have also been made because of the shipment of one defective piece of goods in lots of thousands delivered and the laws of some of our states permit and legalize such injustice.

We do not suffer from these evils on an advancing market, but to the contrary, when mills, from any cause, are delinquent in delivery, we are threatened with "if you do not make shipment as per contract or sale note, we will go into the market, buy goods to equal delayed shipments, charge to you and if necessary, enter suit against you for the difference." Many of us are familiar with such species of business courtesy and this brand of medicine is prescribed for us as an invigorating and helpful tonic.

Some buyers, and I say some advisedly and all honor to them, meet their obligations, protect their contracts to the fullest extent under trying and oftentimes almost ruinous financial conditions and who do measure up to the full standard of the man; but many, to the contrary, seem willfully repudiate an honest contrcat to protect their bank account. This nefarious practice is as damaging in its results to the legitimate and honest buyer as to the manufacturer, because he accepts delivery on his order, regardless of conditions, while his competitor repudiates his contract, bought possibly at the same time, from the same mill, at the same price, and on the same terms. What is the remedy? In law we are advised that we have cause for action, as follows:

1st. The manufacturer may retain the goods as his own and sue for such damages as the breach of contract has brought upon him.

2d. The manufacturer may store and hold the goods as agent of the buyer, to be delivered to him upon his demand and sue for the whole contract price.

3d. The manufacturer may sell the goods for account of the buyer and as the buyer's agent, giving the latter due and timely notice of the time and place of the sale and then sue for any deficiency.

To accept either of these alternatives involves expensive litigation, long delay, loss of business and considerably worry of mind.

As counter remedy, I would suggest:

1st. A higher sense of honor and business integrity between buyer and seller.

2d. A greater respect for the moral obligation involved in a contract.

3d. Arbitration—by a committee of experts in cotton manufacturing processes.

An ideal business condition would be realized if the honor and integrity of a contract was recognized as paramount to law, and even more idealistic if the moral obligation was such that the unwritten word was the unbroken contract.

I would advocate an expert Board of Arbitration, covering all branches of the industry, to which board all questions of differences between buyer and seller should be referred.

This board to consist of one member from The National Association of Cotton Manufacturers,

American Cotton Manufacturers' Association, Arkwright Club, National Association of Hosiery Manufacturers, and also a member representing commission merchants, converters, dry goods, yarn dealers, etc.

We have an Interstate Commerce Commission, a very integral part of our government, whose duty is the control of the railroads of the country, to adjust complaints and to protect the rights and privileges of the people. Why not also a Court of Arbitration, composed of men familiar with the manufacturing and industrial trades of the country, men whose qualifications for office alone should be business training and experience before whom we could appeal for final adjustment and settlement of all disputed industrial problems.

A verdict rendered by such a board would be more satisfactory and conclusive than if rendered by a jury of any twelve men, ignorant possibly of the details, construction and intricacies of manufacturing; their verdict is often arrived at by personal like or dislike or more probably guess work.

I believe that I am justified in laying it down as a safe proposition, without exception, that one afraid of arbitration is also afraid of the justice and honesty of his cause.

To my mind, therefore, it is absolutely necessary that we manufacturers maintain a closer union for our mutual interest and welfare, not only as a safeguard against existing evils, but also to enable us to defend our industry against enslaughts which are sure to come in the not distant future, which will require our very best efforts and united influence. Above all, the maintenance of American business honor and integrity is necessary and essential and the future prosperity and development of our industry demands that they be inviolate, and he who would disregard such principles in business must be eliminated from our commercial and industrial life.

The secretary announced that, owing to illness, Walter S. Newhouse had been unable to complete his paper on Uniform Contracts, but would have it ready in time so that it could be published in the report of the proceedings. The following paper was then read:

A Consideration of Certain Limitations of Scientific Efficiency.

HENRY G. BRADLEE, 147 Milk Street, Boston, Mass.

During the past year we have become quite familiar with the word "efficiency." It has appeared prominently in the public press, in popular magazines and in many more serious publications.

Stripped of technicalities the method of the modern efficiency engineer is simply this: First, to analyze and study each piece of work before it is performed; second, to decide how it can be done with a minimum of wasted motion and energy; third, to instruct the workman so that he may do the work in the manner selected as most efficient.

There is nothing fundamentally new in this method. The underlying principle is being used today to a greater or less extent in all industries and has, no doubt, been used at all times in the past. Let us keep this fact just as clear in our minds as possible.

The method as employed by the modern efficiency engineer is distinctive, not because it is new, but because it is carried to much greater detail.

The modern efficiency engineer is not content to plan out work along broad general lines. He proposes to go at it in a more scientific spirit. He plans to make a systematic study of every detail and obtain maximum efficiency through prevailing waste and loss at each and every point.

With this in view he watches every motion of the workman's hands and body. If any unnecessary movement is made he tries to change the conditions under which the work is carried on or gives instructions to the workman so that the wasteful act may be avoided in the future. Every motion made and every bit of energy expended must be made to yield useful results in so far as this is possible.

The form of organization adopted naturally has the same end in view. The number of overseers, supervisors, experts and specialists, in proportion to the number of workmen, is materially increased.

Special accounting systems are adopted to show at a glance what proportion of the cost of a piece of work is necessary and what proportion is caused by wasted energy. The information so obtained is used as a guide to prevent waste in the future.

The workman is encouraged to cooperate through the use of a bonus system which aims to give the highest pay to the most efficient worker.

These methods applied in certain cases have produced some very surprising and satisfactory results, but it is by no means a necessary conclusion that they can be universally applied with equal success.

As I have already indicated, we are all of us familiar with the general principles underlying the methods of the efficiency engineer; many of us make frequent use of these principles in the conduct of our business. I think I am correct in saying that in the business with which I am connected every general principle and every detail method which has been suggested by the efficiency engineer has been used at one time or another and many are in use today.

The subject is then a familiar one to all of us; the problem presented is not the adoption of something entirely new, but rather the extension to every detail of our work of something which we have already tried.

When we look at the matter in this light we naturally ask ourselves, is it in all cases practical and desirable to extend these methods to all parts of our work, if not, under what circumstances may it be done to best advantage?

It would be impractical to fully answer these questions within the limits of a short paper, but we may suggest very briefly a few factors which seem likely to limit the practical working field of the efficiency engineer.

When we consider these methods of careful study and analysis, and of detail instructions to

workmen, we are first impressed by the fact that such study and instruction must be expensive. It must be performed by men of considerable ability, and consequently, high pay, or it will not be effective. These men moreover have assistants, accountants and others, to help them in their work.

Such methods therefore can only be used to advantage where a material saving can be made.

If a piece of work is to be performed but once we may plan, in a general way, the manner in which it is to be done, but should we attempt to decide before starting the work the exact manner in which every detail is to be handled; should we attempt to teach each workman exactly how each motion of the hand and body may best be made, surely the cost of planning and instructions will far exceed any possible saving in the cost of labor.

If the work is to be repeated several times, but each time is to be performed under new conditions, the same difficulty will be found. Each new condition will require new thought, new planning and new instructions to the workmen.

If the work is to be repeated a dozen times, under uniform conditions, instead of only once, we may profitably carry our preliminary planning into greater detail, but not until the work is to be repeated over and over again can we begin to consider the adoption of the full program of the efficiency engineer.

Here then we have one of the first conditions of success. Scientific management will clearly yield its best results when the labor performed consists of a continuous repetition of some definite act or series of acts, and when the work is carried on under conditions which remain practically uniform.

For a similar reason we may expect to have greatest success when we have a large number of workmen doing similar work. For example, consider two factories, each employing one hundred men. Let us assume that in the first each man is doing exactly the same work as his neighbor. In the second, the work of no two men is exactly alike. In the first case, any planning of work applies immediately to all workmen. We can afford to give much time and thought to each detail of the work because the slightest saving in the work of one man may be applied to all and multiplied by a hundred may become of material importance. In the second case, each man must receive special study and instruction. The cost and difficulty of efficiency methods under such circumstances may easily be prohibitive.

Our second important factor, then, is that the work of the different employes shall be reasonably uniform in character and not extremely diversified.

Next we may consider the territory covered by the work of any industrial organization. Imagine a factory employing a thousand men under a single roof. Then imagine an industry employing an equal number of men distributed through forty different cities, an average of twenty-five men in each city. Can there be any doubt that the introduction of the methods of scientific efficiency would be fraught with a hundred difficulties in the second case for every one in the first? This is by no means an imaginary condition. In these days of rapid communication and travel, many industries are forced to extend their activities over very great areas. The steam railroads are a typical example of such an industry. The largest system in the country, that of the Union and Southern Pacific Railroads, has 80,000 employes spread over 18,000 miles of track and located in branch offices in most of the principal cities of the country.

Here, then, we have a third limitation. The extent of territory which a business covers may make it difficult, or entirely impracticable, to use the methods which give greatest success when applied to a group of men working in a single building.

Where, then, shall we look for work to which efficiency methods may be successfully applied? Where can we find a considerable number of men, located near together, preferably in a single building, all doing the same kind of work under conditions which remain practically uniform, and the work itself consisting of a continued repetition of some definite act or series of acts?

Work of this character will presumably be found in certain mills, factories and shops and in some special departments of other industries.

There are the places where we may expect the efficiency engineer to meet with greatest success, and if we may judge from the examples quoted by these engineers it is in just such places and under such conditions that the best results have so far been secured.

But this is only one side of our problem. As we study it further, we discover that even where conditions are favorable to efficiency methods we still find limitations which will prevent their adoption.

Low cost of operation or of manufacture, is, after all, only one factor out of many to be considered in measuring industrial efficiency. It frequently happens that the lowest cost can only be secured through sacrificing other and more important factors. This we have already mentioned in connection with steam railroad organization. Let us consider some other examples.

A majority of our countrymen believe in a tariff to protect home industries when the cost of manufacture at home is greater than that abroad. They approve the tariff because they believe that there are advantages from diversified business which more than offset any increased price of manufactured goods.

We pass building and factory laws which continually increase the cost of construction and manufacture. We do this because we believe that cost should be subordinated to public welfare, health and safety.

We use a special delivery stamp, send a telegram in place of a letter, or ship merchandise by express instead of freight because saving in time is more important than saving in expense, or because there are advantages in extending our business over a considerable area and this can only be done by using these methods.

The steam railroads increase their operating costs per ton mile by operating express service. By doing this they have helped to build up indus-

tries which could not otherwise exist. We are glad to pay this extra cost so that we may no longer be dependent on a local supply of fruits and other perishable goods.

In construction work we frequently adopt methods which might be considered extravagant if we overlooked the advantages which come from completion of the work by a certain date. Delay in completion is often far more serious than quite a considerable increase in cost of the work.

The spirit which runs through an organization, its esprit de corps, is an important factor in its success or failure. A superintendent or foreman who has the faculty of keeping his men always happy and contented, even though he is, at times, somewhat extravagant, may be more valuable and more truly efficient than another who is able to get a little more work out of his men but who keeps them continually growling and grumbling against the business and their employer.

An electric light company will spend a large amount of money to purchase and maintain a storage battery solely to prevent momentary interruptions to service. Continuity of service, even at increased cost, is necessary to retain public goodwill and patronage.

Let us consider one or two cases which will illustrate what I have in mind. We may take one of these from the very methods advocated by the efficiency engineer.

One of the first steps taken by such an engineer is to establish an elaborate system of cost accounting; a second step is to increase the number of supervisors and specialists employed to oversee and direct the work of the laborers.

This increased cost is deliberately and intentionally incurred for the purpose of saving a greater amount in other items of expense.

If we should consider the accounting department by itself without reference to the rest of the business, or if we should simply compare the number of supervisors and specialists with those employed by some other concern doing a similar business, we might establish a very good case to prove that the efficiency engineer is most extravagant and uneconomical.

If we are to be fair and just to the engineer we must consider the results of his work as a whole and not condemn him because he has increased expenses in certain departments.

A second very simple case will illustrate how efficiency in one direction may conflict with efficiency in another. The crew on a locomotive have three duties, first, safety of the train and its contents, second the maintenance of schedules and third, operation of the locomotive at the lowest possible cost. Let us suppose the railroad is making a special effort to improve fuel economy. The locomotive crew become very much interested in the matter and the first year they succeed in saving several hundred dollars worth of coal. The second year they decide to do even better, but one day when they are trying to make a particularly good coal record they run by a signal, wreck the train and kill a dozen passengers. How shall we measure efficiency in this case? Coal efficiency is high, accident efficiency is low; the two are always somewhat in conflict. It would have been much better for this road to have burned a little more coal and avoided the accident.

It has, I think, always been recognized that there is an element of danger in fixing one's attention too closely on detail economies. We have all heard of the man who was penny wise and pound foolish. We are also familiar with the man who saved at the spigot while he lost at the bunghole.

This brings us to another very important limitation in the introduction of efficiency methods. Human nature must surely be taken into account. No two men are exactly alike. One man is naturally systematic, he plans out all his work with great care, decides exactly what he wishes to accomplish, and then works steadily along the lines which he has laid down toward the objective point. Another man is a pure opportunist. He, too, has a definite object in view, but he continually varies his plans and methods to meet new or changed conditions as these arise. The tendency of the first man will be to go through or over any obstacle he meets. The second man will follow the path of least resistance, and if he finds an obstacle in his way will be more likely to go around than attempt to overcome it. The first man will reach his decisions slowly and after giving careful consideration to all sides of the question. The second man will decide quickly, often apparently by intuition rather than by any definite process of reasoning.

In our modern business world we find many men of each of these types and others graded all the way between. The careful, methodical man will usually conduct his business more economically than the opportunist, and we will probably find him much more ready to welcome the methods of the efficiency engineer.

The opportunist may be somewhat less economical, but it by no means follows that he will be less efficient if the results which he accomplishes are considered as a whole. Quite the contrary. The leaders of industry, the men who do the most to develop natural resources and industrial prosperity, are very frequently of this type. They are likely to reject the methods of the efficiency engineer, not from any prejudice or animosity, but because such methods do not come natural to them. They believe they can secure the best results in other ways and in this they are probably right.

Anyone who has been familiar with the work of a large organization of men can hardly fail to have seen the unfortunate results which come from attempting to force men to work in ways which are to them artificial and unnatural. Personality is a factor which cannot safely be neglected. It has never been possible in the past, and probably never will be possible in the future to lay down one rule or method by which all men shall work.

I have mentioned only a few of the limitations of scientific efficiency, and have considered these very briefly, but I have perhaps said enough to show that the problem of scientific management has many sides all of which are worthy of careful consideration.

When we have given these limitations the consideration which they deserve I think we will reasonably conclude that we are not likely to see any sudden and remarkable increase in industrial efficiency.

Permanent progress in this world is, after all, a process of evolution, not of revolution. Steadily from generation to generation, we have increased our efficiency in manufacture, in agriculture, in transportation, and in all the many other activities which form a part of our complex civilization. We are still far from perfect and we are looking forward hopefully to a similar or even greater progress in the future. In this progress the principles underlying scientific efficiency will perform a part as they have in all that has been accomplished in the past, but they will constitute only one factor among many others, a factor which will frequently be of comparatively small importance.

The efficiency engineer may easily prejudice his own cause by making exaggerated claims and statements of what he can accomplish. He may discredit his own profession by criticising too freely the work and methods of others or by rashly condemning the efficiency of our present industrial organization.

I cannot better illustrate the efficiency already attained than by quoting from a recent address by Mr. Frank Trumbull, Chairman of the Board of directors of the Chesapeake & Ohio Railway Company:

"If you should write a letter to an American railroad official, his corporation will have to haul a ton of freight—2,000 pounds of average freight, coal, ore, silks, ostrich feathers and everything—for more than two and a half miles to get money enoguh to buy a postage stamp to send you an answer."

Mr. Bradlee's paper gave rise to an interesting discussion in which Geo. P. Grant, and Frank P. Bennett took part. Mr. Grant took exception to Mr. Bradlee's views, and claimed that the old method consisted of driving the help, while the scientific efficiency method was based on leading the operatives. Mr. Bradlee replied that his experience showed that leading was an important feature in the old or present system. Mr. Bennett pointed out the need of greater efficiency in the distribution of goods to the consumer, illustrating his point by comparing the manufacturer's prices for several well known fabrics with those paid for the same goods by the consumers.

Following this discussion came the reading of the following paper:

Co-operation Between Departments of the Federal Government and Textile Manufacturers.

ALBERT FARWELL BEMIS, 40 Central St., Boston, Mass.

The purpose of this article is to refer briefly to the opportunity and the necessity for cooperation between manufacturers of cotton goods and the varied work of our government at Washington, and to suggest a way in which this Association might be of more service to its members and our national government.

In classifying government work with the above purpose in mind, it is necessary to refer to the three general departments of our government laid down by the Constitution, and probably first called to our attention in primary school literature, namely,—the legislative, executive and the judiciary. With the judiciary we have no concern at this time. I wish to refer only briefly to the legislative department, and chiefly to the executive.

LEGISLATIVE DEPARTMENT.

The legislative departments of our government at the present time, both state and federal, quite accurately represent in their attitude and the resulting legislation the people of the country as a whole.

There never has been a time in the history of the world when the law-making body of one of the world's principal nations so directly and accurately reflected the desires and views of the people as is the case in this country today. It is a duty which we all owe to the State to do what we can, whether much or little, to direct public opinion along the right lines, to help make clear to the people all great errors in their reasoning, and, by weight of numbers and force of right logic, to influence legislation along channels that will bring the largest good to the largest number.

There is a great deal of political false reasoning in these days, and to a large extent the handworkers on the one side seem to be drawn up against the manufacturers on the other. In assuming a larger control over legislative matters than ever before, the masses are not realizing the part gardless of financial wealth. The organization of society is so complex, and so intimately involves each individual, that it is practically impossible to which every individual must assume in society reenact any piece of legislation referring specifically to one class without intimately and, perhaps, seriously affecting all other classes. By decreasing the legal number of working hours per day, by increasing taxes levied directly against manufacturers, by increasing legislative restrictions of all kinds, the cost of production is bound to increase as a result, and the market prices of the product affected are bound to increase. In other words, there is a resulting increase in the cost of living, and often those who are chiefly affected by such an increase are the last to realize that they themselves are the principal cause of it. It would be folly, if not suicidal, for laborers to legislate manufacturers into bankruptcy, resulting temporarily in the loss of their means of support and serious disturbance to social and economic conditions. It is also equally true that manufacturers should respond to the social needs and rightful demands of the working classes, for without an intelligent and prosperous people how can the manufacturer hope to perform his proper function in society?

With this increased tendency on the part of the laboring classes to influence legislation, it becomes more and more essential for manufacturers to take an active part in placing their views before legis-

lators, and however much of a nuisance appearing constantly before legislative committees may be, manufacturers should organize for that purpose, or make use of the organizations which they already have.

Congress is made up of nearly one hundred members of the Senate and about four hundred members of the House of Representatives, and there are changes of greater or less intensity in each house every two years. Although Congress is in session about half the time, there is very little opportunity for the real consideration of legislative measures on account of the vast number of bills proposed at each session, amounting to approximately 20,000. The average length of time at the disposal of Congress for the consideration of each bill introduced is only about five minutes. The real work in most legislation in these days is done by standing committees, and those committees through public hearings provide for this Association the opportunity to assist and cooperate with the legislative branch of the government.

Is it too much to expect that this Association should keep its secretary, or other representative, in Washington enough of the time during the sessions of Congress to keep in touch with legislative matters and to keep our members informed regarding bills of particular interest to them?

EXECUTIVE DEPARTMENT.

In the executive department of the federal government we find the work of greatest interest to manufacturers, although, in most cases, little known to them. Almost the entire administrative or executive work of the government is done by or directly under the supervision of the President. There are two or three commissions, however, which are largely independent of him, namely,—the Interstate Commerce Commission, Civil Service Commission, and, in the same class, the Smithsonian Institution. All other executive work is done by the President through members of his cabinet, or heads of departments, such as Secretary of State, of the Treasury, of War, etc. In these departments, not including the Department of War and Navy, there are about two hundred thousand government employes, a considerable portion of whom are located directly in Washington. The work done by these departments, in so far as it is of a routine nature in carrying out governmental functions of control, supervision, maintenance of law and order, etc., though of great interest to the manufacturer, does not directly require his attention and help.

But there is not a department in Washington which does not have something of particular interest for the cotton manufacturer, and the work of some of the bureaus or sub-departments, especially those devoted to the fostering of industry, is so vital to our interests that attention is imperative.

BUREAU OF STANDARDS.

The plant and working force of the Bureau of Standards are located three or four miles from the center of the city of Washington, this bureau at present being in charge of S. W. Stratton, Director. The bureau is growing rapidly in the amount and importance of its work, which "includes such researches as are involved in the establishment and maintenance of the various standards and units of measurement, the development of measuring instruments and methods of measurement, the determination of physical constants and the properties of materials."

One function of this bureau is to establish and maintain standards of weights and measures. This devolves upon the government almost as a necessity. It is not, however, the duty of this bureau to establish and enforce commercial standards, that is, to establish standards by which steel products or glass products or textiles shall be bought and sold, but it has a duty to perform in which, by commercial consent, it can be so used by manufacturers, buyers and sellers. This duty is to investigate all materials and manufactures bought by different departments of the government, and, by determining practical limits of variation, establish standards and make specifications under which purchases by the government shall be made. The fixing of such standards for use by the government has in many cases resulted in the adoption of those standards for commercial use and reference to this bureau for standardization of products. The importance of this work can readily be appreciated. Standards thus established carry with them an authority, which no private organization, such as our own Association, could convey. This bureau might be a great influence for good in the textile trade of the country by well-directed research work in fibers and textiles, and in fixing practical commercial standards covering such matters as moisture in cotton, wool, flax, jute, etc., and the numbering and strength of yarn. They are just beginning to do research work and standardization in these very lines and they court assistance and the cooperation of those interested commercially in these matters, and it is of the utmost importance that this Association should take a direct interest and, if possible, a direct part in this work in so far as it applies to cotton.

BUREAU OF ENTOMOLOGY.

No department of government work during the past ten years has grown so in volume and in real helpfulness to the people as the Department of Agriculture. Under Secretary Wilson the work has been extended in all directions and into new fields; so much so in fact, that the criticism of some of the conservatives against the expensive, paternalistic operations of this department has at times been showered upon the head of Secretary Wilson as being responsible for grossly wasting the public funds. No doubt, in the work of this department, there have been many cases where, looking backward, it is now easy to see that large savings might have been effected, or where experimental work has been without adequate results, or where the work of the department has been wise and good but not made use of by the people. Still, it is probably true that no department of the government has been so largely responsible for the great awakening of this country to the necessity for conservation and the use of correct scientific methods.

In modern times, with German scientists leading the way, it is necessary to study and analyze the

minutest details of our agricultural operations and possibilities. This involves work of a highly scientific and often of a highly experimental nature.

in this line, not only because of the size of its pocketbook, but also because of its almost unlimited power to act and to command the support

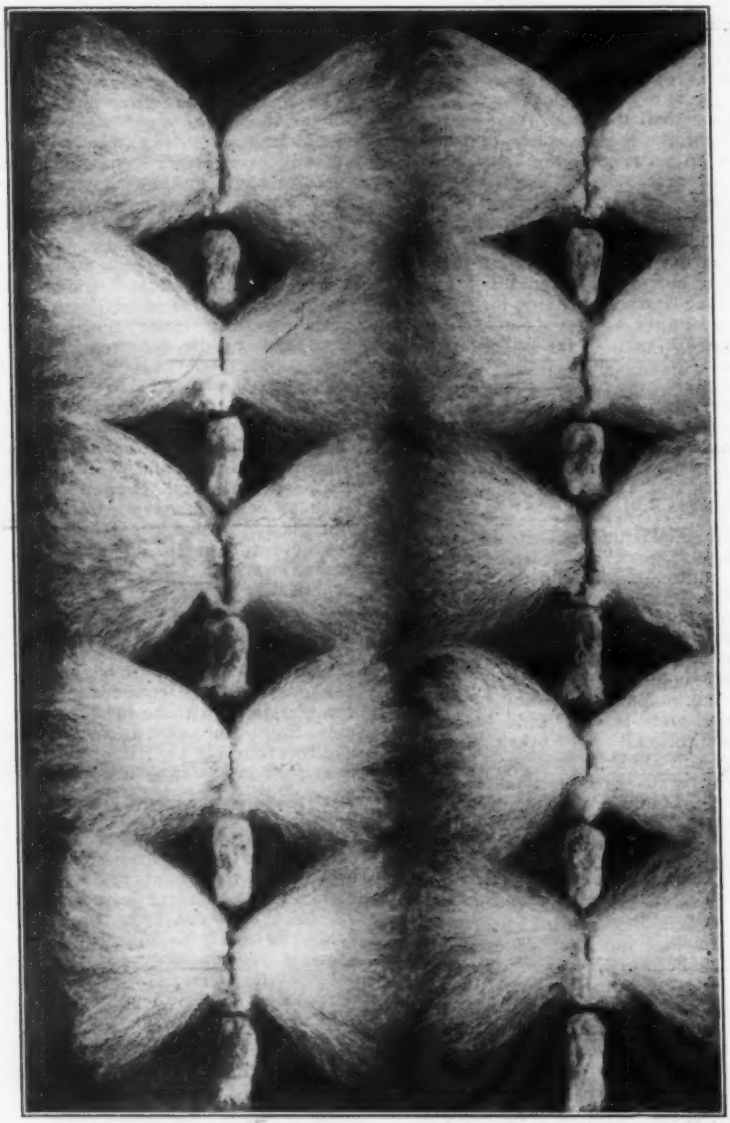


EXHIBIT B.

Whereas work of this nature may be and often is undertaken by the individual, and whereas most of the states have agricultural departments of varying efficiency, the federal government clearly has the advantage of opportunity for accomplishment

of people in every part of the country, and to conserve for future use the records of work accomplished, thus preventing wastefulness and duplication of effort. There is no line of work that looks so wasteful on the form of a financial state-

ment on paper as experimental or development work. The wonder is not that the Department of Agriculture has expended so much for the work the Bureau of Entomology, under the eminent leadership of Dr. L. O. Howard, in studying the boll weevil and in endeavoring to provide for the

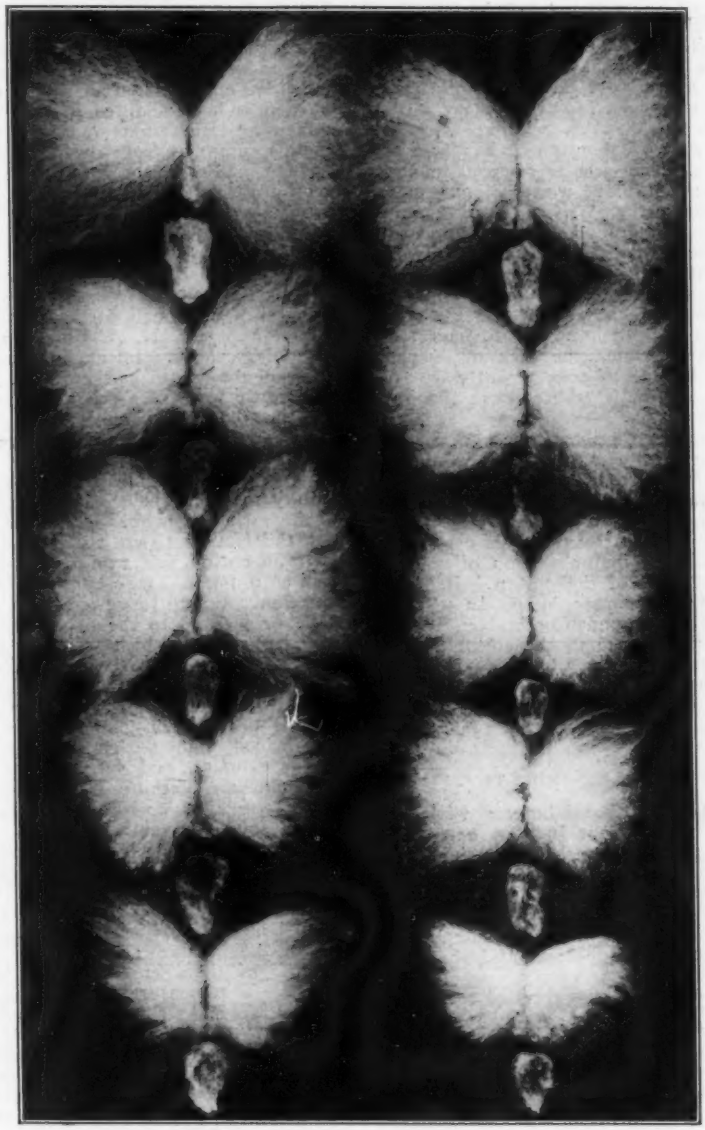


EXHIBIT C.

accomplished but that it has done it at so little cost.

Among the lines of work in this department that are of intense general interest none perhaps so closely affects the cotton spinner as the work of control or elimination of the boll weevil pest, and the only way in which it can effectively and permanently be brought about, namely, entomologically by the introduction of parasites. The most recent publication of the Bureau of Entomology

on this subject is Circular No. 122, issued Dec. 30, 1910, on "The Status of the Cotton Boll Weevil in 1909," by W. D. Hunter.

The cotton spinner can do little to help the Department of Agriculture in connection with this matter other than to foster the general support of the public, which the department should have in this work; but it is of almost vital interest for the manufacturer to know what is being accomplished in this matter, and to get the latest information in regard to the subject. It is not easy for the cotton spinners to do this without frequently going personally to Washington or having a representative there. The circular referred to above was evidently written in the winter of 1909-10 and approved by Secretary Wilson April 1, 1910, though not issued in printed form for public distribution until December 30. Unless methods have changed, without a special inquiry by mail or in person, addressed to the Bureau of Entomology, we shall probably not know what was the status of the cotton boll weevil in 1910 until next January. This well illustrates the lack of despatch found in certain features of government work (due to "red tape"), especially where more than one department is involved.

While in Washington a short time ago, I spoke with at least one authority on cotton in another bureau of the Department of Agriculture, whose strong belief it was that the Bureau of Entomology would never be successful in finding means of suppressing the boll weevil, and that this pest would successfully invade the major portion of the central and eastern parts of the cotton belt, where lands are low and the climate damp. In so far as this opinion has any foundation in fact, it indicates the great importance to the cotton spinner of keeping in touch with the Bureau of Entomology and being up to date in information on the boll weevil. How can this be better done than through the frequent presence at Washington of this Association's secretary?

BUREAU OF PLANT INDUSTRY.

Of the various departmental bureaus visited by me, the Bureau of the Plant Industry seemed to be the best organized and perhaps the most progressive. Without counting those at work for this bureau in other parts of the country, there are in Washington approximately 1,500 persons. Seven hundred of these devote more or less of their time to cotton, and approximately half that number chiefly or entirely to cotton.

A trip of two or three hours through the different departments of this bureau will convince any cotton spinner of the great opportunity that there is for mutual helpfulness by cooperation between that bureau and cotton manufacturers. That is the head center of operations in the development of the cotton industry of the country along scientific lines.

In recent years there has been in this bureau a Department of Technology to which I wish to call special attention because it is a link which should serve to bind more closely together, as they should be bound, the cotton grower and the cotton spinner. In this department a study is made in crop technology and of improved apparatus and methods of ginning and baling cotton, and a study of length, strength and character of fiber with respect to the spinners' needs. It is proposed to investigate humidity in cotton and already the cotton trade in this country has felt the effect of work of this technological department through the standardization of cotton grades. These standard grades, selected by a large, unofficial committee of cotton growers, brokers and spinners, chosen from all sections of the country, have now been adopted as commercial standards governing transactions by all the cotton exchanges in this country except the New York Cotton Exchange, and a recent vote of that exchange indirectly on this subject a few days ago indicates the probability that the New York Cotton Exchange will also accept these grades as standard for commercial use.

Among other lines of work being undertaken by this technological department, there is one to which I wish to call particular attention. Under direction of Dr. N. A. Cobb, in charge of this technological department, investigation has been made of the length and variation of cotton fibers. Very little work of a scientific nature has heretofore been done in investigating length of staple and variation in length. There has been an astonishing lack of knowledge among cotton growers, brokers and spinners on this point. An inquiry made by the writer a year or two ago as to the variation of fiber lengths in cotton, brought out the fact that, whereas all admitted that the fibers in cotton that would pass commercially for inch cotton would vary considerably, not a broker or spinner among those consulted had any knowledge or idea as to the proportion of fibers that would run over an inch or the proportion of those that would run under, or as to the maximum length or the minimum. Whether any given lot of cotton would class commercially as seven-eighths of an inch, one inch or one and one-eighth inch might be left to the attitude and skill of the sampler, and yet accurate knowledge on this point is something of great helpfulness to the manufacturer, as well as to the grower, in determining spinnable value.

It has devolved upon Dr. Cobb to devise a method of determining and defining length of staple. This is done as follows:

From different portions of a sample or bale small bunches of fibers are taken at random, and 400 of them measured accurately by having the shadow of them enlarged and thrown upon a screen. The measurement of these 400 fibers is then expressed graphically in what Dr. Cobb has termed a "graph." This is simply a diagram on which are plotted each of the 400 fiber lengths, beginning in the center with the longest and then each succeeding length down to the smallest being plotted first on one side of the center, then on the other. The horizontal index of each graph indicates the number of fibers to the scale of 50 fibers per inch, the total horizontal length of each graph representing 400 fibers being 8 inches. The vertical index indicates length of fiber, scale 5 to 1. This index begins with zero. The average length is shown by a horizontal line. "Dust" is considered a negligible quantity, and not included in the stapling or graph. The result is a line or

curve which shows exactly the variation in fiber lengths between maximum and minimum and the proportion of different lengths.

[The author then shows sample graphs made under the direction of Dr. Mann of the Bureau of Plant Industry, from samples of cotton and a sample of yarn furnished by the writer.]

Nothing of more interest and value in connection with the length and variation of cotton staple has ever been brought to the attention of cotton spinners and growers than this graphical method of stapling. It is not the purpose of this article to treat this matter technically nor in full, but I do wish to call your attention to a few of the points and a few of the questions that these graphs bring out, such as the following:—

(a) A practical and definite method for standardization of staple lengths.

(b) An opportunity to study and determine much more clearly than heretofore the spinning values of different kinds of staples of cotton.

(c) A better opportunity than heretofore for studying relations between different varieties of cotton and the resulting yarn.

(d) An opportunity for studying the design and adjustment of machinery in each process of the work with a view to preventing waste of the more desirable fibers.

(e) In general an opportunity for determining with definiteness the true economical relation between varieties of cotton and varieties of yarn.

In the graphs submitted herewith I wish to particularly call your attention to three points.

Cotton A was of a soft, light upland variety. D was of a heavier character, perhaps medium in body. In order to bring out the difference between the staple of cotton by finger tests and by the graph method, I submitted samples of A and D to four experts. Two classed A as one-inch staple, and two as scant one inch. Sample D was classed by one as being fully one inch, and by the other three as being fully one inch to one and one-sixteenth inch. Note by graph 4 that A and D average almost the same in length of staple, both falling a little below fifteen-sixteenths of an inch. In finger sampling judgment was evidently affected by character of staple, and in both cases fibers longer than the average were sorted out to determine the length.

Please notice another point in connection with graph 4, namely, the greater variation in length of fiber in upland variety A as compared with D. The closer the graph approaches the horizontal over the major portion of its length the more uniform and, in general, the more desirable is the character of the staple.

An extremely interesting point is suggested by graph 5. Note that as the machinery which made Yarn D was set all the fibers in the raw stock were getting into the finished product in their original proportion except the longer ones. This raises the question in what process the longer and more desirable ones, from a strength point of view, were cut out. Very likely this occurred in the spinning frame and due to some of the longer yarns being broken by the close setting of the rollers. This could be determined by a closer study of the matter method than I have been able to undertake in time for this article.

Whereas, the stapling of cotton graphs is done with accuracy, and whereas, the labor and time required for doing the work have been materially reduced by several ingenious devices and methods, it is still attended by too great expense to have wide application and usefulness in everyday practice. The missing link needed to make this the standard commercial method of determining and specifying length of staple, is some device or machine that will enable graphs of any sample to be determined quickly and inexpensively, even if necessarily with some loss in accuracy. It is very much to be hoped that some ingenious mind will bring this about.

The closing session on Thursday began with the reading by the secretary in the author's absence of he following paper:

How the Cotton Industry Has Safeguarded Its Employees.

GEORGE V. S. MICHAELIS, Civil Engineer, 90 West Street, New York City.

The cotton industry, of late, has been condemned by some earnest, no doubt, well meaning, but possibly illogical critics as lacking in protection to the life and limbs of its employes. These critics have not studied the history of the industry. They do not know of advances that have been made. They do not understand the motive force that is responsible for past good work and which is constantly seeking yet greater improvement.

To listen to the critics one would be tempted to believe that the cotton manufacturer cares less for his employes than he does for his cotton waste, out of which he is ever seeking to make a few more cents. Yet each employe absent from work for any cause means that not less than $3,000 of productive investment in machinery is idle, eating into dividends. When cotton manufacturers get together there is no more vital topic than labor supply—how to secure it; how to keep it; how to utilize it to profit, which alone warrants employment and keeps Professor Fisher's "hired man" money at work in this industry.

The recent fire horror in New York leads one naturally to consider the fire hazard first in studying this question of what and why the cotton manufacturer has done to protect his employes. Similar horrors marked the early days of the cotton industry. The impression of terror left affected the labor supply. The work of the late Zachariah Allen of Providence, R. I., in adapting the methods of constructing the floors and roofs of the Swiss Chalet into the now familiar slow-burning construction of the New England cotton mills beban as an endeavor to protect life. Another Providence man, the late Amos D. Lockwood, was largely animated by the same desire. What the results have been is told in dollars-and-cents by the reduction of fire insurance premiums and liability from injury to employes through fire resulting from contributory negligence by the employer. No other industry can show such humanitarian re-

sults, growing out of money saving and not legislation as can be noted in the history and results of the factory mutual fire insurance companies in the textile industry, beginning with cotton manufacture to the development of which the late Edward Atkinson gave his life, and to which Dr. C. J. H. Woodbury made many important contributions.

The "factory mutuals," as they are called, have with the greatest enterprise forced the adoption of changes which in the diminution of the fire hazard have diminished the hazard of the help from injuries by fire. This fire hazard as shown by the cost of insurance on cotton manufacturing processes, has diminished from 3 1/2 per cent. or $35 down to 7 1/2 cents on $1,000, or 1/47 the former cost of doing business.

The greatest single economizing contribution to the community in the the destruction of the great fires occurring in cotton mills, undoubtedly has been the automatic sprinkler in which inventions of late years have succeeded in surmounting a problem by which the heat of the fire has actuated elements of its own extinction, which method was originated by Sir William Congreve in 1768 and brought to a state of practicability by Henry L. Parmelee a piano manufacturer of New Haven, Conn., over a century later and he was followed in a successful manner by Frederick Grennell of Providence, and others.

How mill construction has included consideration of employe's safety is shown by referring to Mr. Lockwood's improvements in building. Among others was the greater security of the belt porch or tower carrying the large belts conveying power from story to story, which were made more secure and their hazard diminished. Another, was his insistance that there should be two towers containing stairways attached to each building. At that time it was the custom to place vertical iron ladders between small platforms outside of the building, with very small landings at each story. These ladders were small in delivering capacity and could be used only by a person in the prime of physical strength with clear head and were better fitted for sailors and acrobats than an excited crowd largely composed of women. These outside fire escapes were very much improved by the making of outside skeleton stairs of iron pipe which it is believed was first done at the Indian Orchard Mills near Springfield, Mass. Next there were installed stairways on the mill walls and on the outside of the platforms or landings a large ladder for the use of the firemen or active men, a method first adopted by Gilbert P. Whitman of the Amory Mills in Manchester, N. H.

So, we can see how the desire to keep help and to keep down expenses has worked to make cotton manufacturing so safe from fire hazards. This does not mean that all mills are safe, for there are small mills rejected as hazards by the mill mutuals and there are manufacturers not sufficiently intelligent to see the profit in safety. Perhaps legislation to bring up such laggards to an established standard may be justifiable in spite of what it may entrain of economic disaster in failing to recognize the importance of placing upon the individual responsibility, that is a matter for individual judgment.

The tendency of the day to ignore individual responsibility and to seek remedies in collective action, more particularly through legislation, is nowhere more strikingly shown to the student of the question than in the matter of protection of employes against risks of injury by accident.

It is humanitarianism, we are told that is required. Aside from the economic question, there is the fiduciary relation of manager to owners and shareholders. A cotton mill manager has no more right to consider humanitarianism as an end in designing or operating a mill than he has to take mill money to make a personal subscription to foreign missions or settlement work. Any one of these may be worthy and it may be of personal gratification to assist in good work, but it is not a proper means of employing mill money.

Fortunately, however, notable humanitarian results have been accomplished as a product of business expenditures not primarily expended for that purpose, to a greater extent than pure charity would have made possible. There is a danger in this whole question of employer's liability and employe's hazards, that is, of making malingering profitable.

One risks opprobrium in speaking frankly of this phase of the question. Yet it cannot be denied that side by side with those faithful and devoted fathers and mothers who are the credit and the pride of the cotton industry are to be found shiftless persons dreading the daily pressure of manual labor, yet prefering it to hunger. To this class an accident earning a pension, for so it is regarded, is not more than momentarily horrible.

Again risking opprobrium the student must consider the importance of the education in individual care in limited liability. Each operative is made more careful of himself or herself and of the life or safety of others by the risk of permanent suffering.

So much for underlying principles: against this consider what the better class and, a significant fact, the more profitable mills have done. No other class of mills employing both sexes have given such attention to sanitary conveniences and decency. It was the mill men of Lowell who organized in 1839 and opened in 1840 the first really free and not purely charitable hospital in the country, the fourth hospital in all New England, just as it was Lowell mill men who were among the pioneers in public water works construction in America.

It was the desire to improve working conditions so that employes could produce more that warranted the development by the late B. F. Sturtevant of William Durfee's system of forced ventilation and heating. While humidification has been adopted chiefly because of the improved working conditions of the fiber it has been modified for the sake of improved working ability of the operative through the abandonment of the steam jet for other methods. And this consideration of better operative efficiency will yet lead to the adoption of more improved methods, now being perfected, which will give the maximum of humidity for fiber conditioning with the maximum of working ability on the part of the operative.

The agitation for belt guards followed and did not precede their introduction in the stronger

mills. The protection against gears is believed to have been inaugurated in the cotton mills, George Draper and the Biddeford Machine Works being among the pioneers.

The danger from flying shuttles was minimized by guards worked out at Hopedale. The dangers from "kissing the shuttle" have been exaggerated. Such as do exist rest largely on the false sympathy of the operatives in protecting diseased associates from being known to the employers and which is supported by the union and public objection to any attempt at physical examinations. The automatic looms would be in general use did the union spirit of the day permit operatives to make it profitable to all mills to substitute automatic for hand looms. Before legislation is passed forbidding the "kissing of the shuttle," it might be well to see that the mill be enabled to use to the utmost advantage labor-saving machinery. There are men here today who can tell what disaster has followed the attempt.

So far the mercenary motives only of the cotton manufacturer have been dealt upon in the belief that only the wise act is the right act, but there is another side. To an extraordinarily large extent, as compared with other industries, the cotton agent, manager or manufacturer has literally passed through the mill." He has knowledge of the hazards which he is working to ameliorate as fast as conditions permit. He has been a pioneer in the adoption of improvements from the early brick side walks in Lowell to the modern lighting and ventilating systems in the new mills in New Bedford and Fall River. He has had to deal with such economic and racial changes in his help as no other industry has had to contend with and through it all he has given his employes better conditions in the mills than they have asked for or desired in their homes.

In no other industry dealing with the same grade of help are the town conditions so favorable. It would do the critics good if they could contrast the home conditions in foreign textile towns, or country sides or in our own great congested cities with the mill houses to be found from Augusta on the Kennebec to the cities that line the Blackstone.

They do not perhaps compare with the homes of the editors of prosperous magazines, but they are ideal to the Armenian, the Greek and the Roumanian. They must be or the operatives would not remain. The competition that has existed for competent labor is such that only prosperous and contented operatives remain. Distances are so short and travel so cheap in our New England textile territory that privation for the employes has not paid. It is true today that employes are not making as much money as is customary, but neither is the "hired man," as shown by the passing of dividends, and even at that the mills are spending their money to improve conditions by the installation of improved machinery and methods.

Summing up the work done by the mills of their own volition, the whole question of the health and welfare of employes may be considered under four heads: 1. Conditions outside of the mill. 2. Sanitary precautions pertaining to the buildings. 3. Protection of machinery. 4. Improvement in processing.

1. The cotton mills have been pioneers in America since the days of the Lowell Corporations with their tenements (notable for their day) for housing their employes. Union attitude has checked this work from being developed but the special circumstances of the industry in New England have kept conditions relatively favorable and the result from the trolley cars and work of mill officers is steadily improving conditions.

2. Enough illustrations have been given to show the tendency of the industry to improve the sanitary conditions from the initial work of the early constructors and manufacturers down to the present day. The use of women is inevitable for spinning and weaving have the sanction of centuries of tradition as proper work for women and against such a tradition nothing can prevail in a day when even masculine pursuits are thrown open to women. Measured by the family wage and the average long service the conditions are satisfactory to those employed and the mill men are ceaselessly working to improve conditions. This work will progress even faster than the restriction of unions and the pressure of expense would seem to warrant. It can only be delayed through the placing of undue legislative burdens which remove the incentive of intelligent self-interest and increase the financial load without return to employer and employe and which both are therefore compelled to comply with only to the minimum limits required.

3. Protection of machinery has been alluded to enough to suggest to a technical audience, such as this, the remarkable advance that has been made under a policy of free and profitable development.

4. The improvements in processing might be included under the head of machinery were it not for the pains taken to prevent waste in the air which means waste in the earnings and the remarkable improvement in working conditions.

The writer has had no axe to grind in presenting this paper. It has grown out of the friendships established and the knowledge obtained before he gave up the textile end of his engineering work. It is due largely to the cooperation and encouragement of that untiring student of and hard worker for the textile industry, Dr. Charles J. H. Woodbury, whose only excuse for not working up his own unlimited supply of facts is that he might be considered as a prejudiced witness. Perhaps, then, this slight outline, intended more to suggest unbiased thought than to supply partisan argument, may lead to a juster view of the cotton industry and may lead some of its ardent and well meaning denouncers to a study of the facts and real conditions and to a resultant repentance!

This was followed by the following paper:

The Laws of Regain in Cotton and Worsted.

WILLIAM D. HARTSHORNE, Lawrence, Mass.

"Introduction; analogy; assumptions founded on facts and unceasingly rectified by additional observations: a genial form of tact, inborn, but strengthening itself by making numerous comparisons between its indications and the results of experiment; such are the principal means of arriving at the truth."—Laplace, Des Divers Moyens d'approcher de la Certitude.

In part, at least, the above caption which I find to a paper on the Venturi Meter, by Clemens Herschel, must be my apology for attempting to add to the work of Schloesing and others, as well as to the efforts of Mr. Iddings and myself to arrive at the laws of regain, as brought out in a paper read before this Association at the Atlantic City Meeting in 1905. At the close of that paper attention was called to the close similarity, though not identity, of results obtained by Schloesing on both cotton and worsted at 24° Centigrade (75° Fahrenheit) by a radically different method of procedure. This method used by Schloesing of obtaining known (not necessarily constant) state of relative humidities in a vessel or chamber by the use of pure sulphuric acid of known strengths gave a new impetus to the study of the problem, from the point of view that practical benefits cannot reach their fullest fruition until the laws underlying a given class of phenomena are fully understood, or rather that the more nearly we do understand the fundamentals of these laws the greater benefit we can derive from their application to practical, everyday problem. For instance, it is only after the laws of falling bodies in vacuo are known—where the feather and apple behave alike—that we can practically account for the perturbations in these laws in the science of ballistics, or the art of gun practice; or assuming the formal statement of them to be true, and only true in vacuo, that their demonstrated controlling effect on celestial bodies leads to the conclusion that the principal occupant of space is not "matter," as we understand the term.

In the original experiments carried out under the writer's direction in 1896, where a certain skein of yarn was weighed ten times a day for a year, under outside atmospheric conditions, a record of which was kept, it was not found possible to correlate results of regain with either temperature or humidity conditions, owing to the very apparent fact of "lag," that is, the element of time required for the material to assume a condition corresponding to the humidity and temperature, which were never constant for a long enough period to admit of such correlation.

In my paper of 1905, advantage was taken of this lag by weighing two skeins which were one drier and the other more moist than the local conditions would probably give, and the means of results obtained after a half hour or more of time were taken as representing the true data for comparison, and by the aid of a large number of such results, under varying atmospheric conditions, regain tables were prepared by interpolation from charts graphically representing these results on both cotton and worsted. For most practical purposes these tables are probably sufficiently near the truth, under ordinary indoor temperatures and humidities, but for the higher humidities there is a marked variation from the figures given by Schloesing, and the relationship of regain to temperature for the same humidity was not demonstrably apparent. On the other hand, Schloesing's method of making use of conditions of known humidity in obtaining the facts (not the law) of regain neglected the phenomena of lag, or the time element, in the problem. It is true that Masson and Richards recognized the lag element, and in their experiments on absorbent cotton made use of it after a certain manner for a single temperature (20° C.), but the experiments as reported did not extend far enough to generalize as to the law of regain. The general law for such regain was, however, given by the writer in the paper referred to, and its specific application made for worsted at a single temperature (70° F.) with a fair degree of accuracy considering the circumstances of the observations. These observations, however, were not accurate enough to correlate results for different temperatures, particularly at the higher humilities, with anything more than a rough approximation. To do this better it was necessary to obtain the elimination of the lagging effect by direct observations under conditions of constant temperature and constant humidity indefinitely maintained, or so closely known that the constant condition required could be calculated for. To do this many attempts were made which proved failures. Every attempt to obtain greater accuracy in one direction revealed the necessity for greater accuracy, or greater control, in another direction before results could be depended upon to the degree required in order to obtain the controllable conditions described by Schloesing, and at the same time eliminate the lagging effect. The apparatus shown by the phantom diagram, Fig. 1 (see appendix), was finally designed, and so perfected that observations could be repeated over and over again under conditions calculably alike, upon different pairs of skeins, so that a fairly accurate average for a given kind of material could be obtained at as many points of temperature and humidity as might be found necessary. The principle of this apparatus was simply this: That a pair of skeins, one more moist and the other drier than the proposed humidity would give, were hung on the two ends of a common frame within an inclosed metallic vessel whose cover was sealed by mercury and, except the top, entirely surrounded by water, whose temperature could be kept constant by a thermostat. In the bottom of this chamber, parafined for protection, sulphuric acid of known strengths was placed and the frame work revolved in the air above by a little motor, which also turned an agitator in the outside water, thermometers being passed through the lid of the sealed chamber, one in the air and the other in the liquid below, so that the exact temperature of each was known, and, therefore, the exact humidity calculable. The bearing for the shaft was a copper tube held in a conical plug, making a practically airtight joint. When it was desired to weigh the combination the little driving band was disengaged and the hook from the scale above inserted in the hook of the shaft of the framework, just lifting it from its conical bearing, so that the weight could be taken accurately. It will now be noted that the original dry weights of the skeins having by calculation from blank tests on other skeins been made equal, one-half the sum of the weights found would always represent the average present condition of the two skeins. If it should happen that the heavier skein was rela-

tively more moist than the dry skein was relatively dry, compared with the humidity condition, the sum of the weights would in time diminish. If, on the other hand, the dry skein was drier in proportion than the wet skein was wetter then the sum of the weights would increase by exposure in this vessel to the constant conditions of humidity. The revolution of the frame holding the skeins tended to keep all conditions uniform during an experiment.

It was soon found that in about one hour's time an equilibrium would be established between the two skeins so that there was neither gain nor loss thereafter, while the temperature remained the same. It was, however, found that on repeating the same experiment on the same pair of skeins, in the same order, that is, the same skein always remaining the drier, that the successive observations gave continually lower results for the average regain, but if the skeins for a repeated experiment were alternated in condition, that is, the one which had been drier in the first instance was made the damper in the second, then the results represented a very nearly constant condition of regain, not only for the same pair of skeins, but for duplicate pairs, and in the final results a series of tests alternating for the moist and dry state in each on one pair was averaged with a series of tests alternating on another pair for each point of regain determined.

By selecting suitable humidities and temperatures thus accurately controlled it is believed that points of regain in sufficient number and with sufficient accuracy have been found to not only confirm the general law previously propounded in 1905, but to extend it so as to cover for both worsted and cotton the relationship of humidity and regain at all temperatures within the limits of the observations: a result not previously found possible. The largest number of experiments was made on carefully cleansed skeins of soft twisted 2/24 worsted, French Spun without oil, from Australian Merino Wool, and on skeins of two-ply, seven hank roving, soft twisted from combed Sea Island Cotton in its natural state. Check tests were also made on coarse Crossbred Worsted Yarn and Bleached Sea Island Cotton (nearly pure cullulose), but only enough to show that no great variation was to be expected between yarns made from different kinds of wool, and between yarns made from cotton in different conditions.

Having obtained these accurate comparative points, the method of reaching the more complete conception of the laws of regain may be approached by reconsideration of the mathematical formulae presented in the paper of 1905. [The author then describes the mathematical formulae in detail. Interested parties may procure these in pamphlet form.]

Considering the fact that the original methods used were primitive in character, it is interesting to see how closely the tables prepared in 1905, both for worsted and cotton, for ordinary temperatures and humidities, agree with those now more accurately determined. The differences between the tables for cotton for all temperatures up to 50 per cent. humidity being not greater than one-half of 1 per cent. In the case of worsted the margin of difference is a little larger, but not very materially. For the higher humidities my original tables for both cotton and worsted are undoubtedly too low, and the results of Schloesing's experiments at such temperatures as he gives are more nearly correct. A comparison between Schloesing's curves on cotton and worsted at 24° with my new curves at 75°, using relative humidity for one coordinate and regain for the other, as was used in his method of charting, shows the present relationship of these curves as much nearer than exhibited in the first paper. Under the present understanding of the subject, however, I believe that Schloesing's figures are too high above 90° humidity, particularly so on cotton.

SUMMARY.

To summarize the conclusions of this paper as to The Laws of Regain in Cotton and Worsted, we can say:

First. The general law for Cotton and Worsted, and probably for any other textile fiber, may be expressed by the formula

$$H\ K\ R\ T^2 = H\ 5771.44 \times 10^6$$

in which H represents any given per cent. of relative humidity; R the regain at any absolute temperature T; K a variable coefficient depending upon both H, R and T in such a way that for H = 1 the product K R T^2 is a constant quantity represented by the number 5771.44×10^6. This constant number, 5771.44, is the weight in grains of a cubic foot of aqueous vapor at any temperature multiplied by the corresponding absolute temperature, expressed in degrees Fahrenheit, divided by the maximum elastic force of aqueous vapor at that temperature, expressed in inches of mercury. In this expression, therefore, we are independent of tables for saturated aqueous vapor, either for unit of weight or elastic force.

Second. For any given temperature the relation of values of R to the variable K, for both worsted and cotton, is expressed by an hyperbolic equation, differing for each substance (see details in text).

Third. For any other temperatures the law for worsted is:

For the same humidity the squares of the regains at different temperatures are to each other inversely as the cubes of the corresponding absolute temperatures.

Fourth. The law for cotton is:

For the same humidity the first powers of the regains at different temperatures are to each other inversely as the first powers of the corresponding absolute temperatures.

No other substances have as yet been compared in this manner, but for such substances it is quite possible that all these relations, except those of the general formula, may be decidedly different.

In closing I wish to express special indebtedness to Richard P. Iddings, chemist at the Arlington mills, for his very accurate, painstaking observations and clear understanding of the problems upon which the deductions of this paper are based; also to John A. Collins, Jr., for much advice and assistance in preparation of tables and diagrams.

[An Appendix to this paper gives diagram of apparatus used, charts, and tables of regain in cotton and worsted. Copies may be had from the Secretary.]

Mr. Hartshorne's paper was followed by an interesting discussion in which W. W. Crosby, E. H. Marble and Frank P. Bennett took part.

The next paper on the program was as follows:

Power From Producer Gas.

GODFREY M. S. TAIT, 90 West Street, New York, N.Y.

In order that a basis of calculation may be reached comparable to the widest range of power plant sizes, we will consider plants of 1,000 h. p. hourly output, and assume a nine-hour day, six days per week, fifty weeks per year, making a total annual period of operation of 2,700,100 hours.

It is recognized, of course, that in considering a 1,000 h. p. plant we are, if anything, favoring the steam operated installation, which is only able to attain its maximum efficiency in plants of this size or larger, whereas, as will be noted in tables shown later in this paper, the gas power installation has a practically fixed efficiency, regardless of the size of the installation, the one variable being the labor cost, which would assume a larger proportion of the operating expenses per horse power as the size of the plant grew less.

Also in selecting a nine-hour day, we still farther handicap the gas installation, as it has to write off its comparatively higher first cost in a much shorter number of working shifts per day.

It, however, is the writer's wish to make the power comparison a fair one, and without any special load conditions to swing the argument in either direction.

In order to have a basis of comparison, first let us consider the average steam installation, of first class design, and latest improved make, in other words, a thoroughly up to date plant.

The boiler plant in such an installation should be capable of delivering 75 per cent. of the original heat value of the coal, in the form of steam, and allowing a further loss of 10 per cent. between the boiler and engine, we have say 65 per cent. of the heat value of the coal delivered to the engine. Assuming now (and it is a high assumption) that the engine efficiency is 17 per cent. per brake horse power, this will give us a trifle better than 11 per cent. efficiency for the entire plant expressed in terms of brake horse power during time of operation, which is rendered still less efficient, when it is remembered that we have also to allow for standby losses at night, and over Sundays, amounting to a loss of about 2 per cent. more. As against this let us consider the gas producer, and its gas engine.

In the gas producer we find that the total heat value of the fuel is reduced but 20 per cent. in its transformation into a cool washed gas, and as there is no condensation or other loss to figure on, we have 80 per cent. of the original heat units contained in the fuel entering the engine.

We have taken No. 1 Anthracite Buckwheat coal as a basis of comparison in both cases, it being obvious that other sizes of fuel would have proportional costs. This fuel will be found to average 11,500 British thermal units per pound.

Now any of the many standard makes of gas engines, are willing to guarantee a brake horse power from 10,000 British thermal units (some European makes guaranteeing 8,500 British thermal units) we therefore have 80 per cent. of 11,500 divided by 10,000, equals .982 of a brake horse power hour from each pound of fuel at full load, or a total efficiency for the whole plant of about 25 per cent. as against the 11 per cent. available from the steam plant before mentioned.

That the foregoing comparison is a most liberal one from the steam advocate's standpoint is readily shown when it is remembered that one year's test, of most complete accuracy, run on a steam plant of this high type of refinement, and under the very best of conditions showed but 10.3 per cent. total efficiency, while on the other hand, the writer has installed gas power plants where the total efficiency was over 25 per cent. where 24 hour a day operation allowed the elimination of the small stand-by, night loss.

In the face of such economies it would seem at first glance that the knell of all steam installations had been sounded, but the mere economy—great as it undoubtedly is—would not be, and is not, an attractive proposition unless combined with entire reliability, and ability to operate continuously 24 hours per day when desired.

Such service is however now obtainable, but due to the fact that unskilled and ignorant parties, attracted by the apparent profits in the business, have placed some utterly worthless forms of this device before the public, and worse still that the unsuspecting public have actually purchased this apparatus in many cases, it is not to be wondered at that in many quarters, only bad reports can be found of gas machinery.

The situation today as I see it therefore is as follows; on the one hand, we have a device which generally in spite of its record for unreliability, is looked upon as pronounced success from points of efficiency. But which device many conservative manufacturers will not consider on account of the many unsuccessful plants scatterel around the country. On the other hand, we have a device which looks most simple to build, and which many manufacturers, totally unaware of the underlying chemical principle of operation, proceed to build and worse still sell.

The natural result is that the gas producer manufacturers, who really understand the principles involved in the apparatus, and who make a practical, economical, and reliable article (and the total number of such manufacturers of gas producers can be counted on one hand) are everywhere met with tales of the misdoings of these crude devices parading under the name of gas producers, and as a result the sale of such machinery in this country, with all its reputation of progressiveness, is ten years behind Germany for example.

Such a state of affairs should not exist, and it is with a view of appraising you of the actual accomplishments in this field, that I have brought up the subject with you at this meeting.

In conclusion, I take pleasure in appending the actual records of some of the smallest gas plants,

and ask comparison on your part with your knowledge as to what is possible under even the best of conditions with steam plants of the same capacity, and load factor.

Plant No. 1.

35 h. p. anthracite producer,
28 h. p. two cylinder engine,
18 k. w. electric generator (belted),

Cost installed		$3,000.00
Interest and depreciation at 10 per cent.	$300.00	
Supplies and repairs	150.00	
Labor per year	500.00	
		$950.00
Fuel charge per kilowatt with coal at $4.00	.30 of a cent.	
Operating charges per kilowatt	.61 of a cent.	
Total cost per kilowatt hour	.91 of a cent.	

Plant No. 2—(24 hour a day service).

150 h. p. lignite producer,
150 h. p. gas engine,
100 k. w. electric generator (direct current),

Cost installed		$9,600.00
Interest and depreciation	$960.00	
Supplies and repairs	480.00	
Labor per year	1,700.00	
		$3,140.00
Cost of fuel per kilowatt hour	.17 of a cent.	
Cost of operation per kilowatt hour	.43 of a cent.	
Total cost per kilowatt hour	.60 of a cent.	

Plant No. 3—(24 hour a day service).

300 h. p. anthracite producer,
Two 150 h. p. gas engines,
Two 100 k. w. alternating current generators operating in parallel,

Cost installed		$22,000.00
Interest and depreciation	$2,200.09	
Supplies and repairs	1,100.00	
Labor per year	2,400.00	
		$5,700.00
Cost of fuel per kilowatt hour	.30 of a cent	
Cost of operation per kilowatt hour	.40 of a cent.	
Total cost per kilowatt hour	.70 of a cent.	

Plant No. 4.

400 h. p. bituminous producer (suction type, 24 hour day),
400 h. p. tandem double acting engine,
200 ton ammonia compressor (direct connected),

Cost installed (without compressor)		$4,400.00
Interest and depreciation	$4,400.00	
Supplies and repairs	2,200.00	
Labor (three shifts)	6,353.00	
Fuel at 1 1/4 lbs. per horse power	2,916.00	
		$15,869.09

Total cost .459 of a cent per horse power hour.

This last plant was operating on Illinois Slack of 10,300 British thermal units per pound, and containing 4 per cent. sulphur and 38 per cent. volatile matter.

The above figures of actual operating plants should arouse interest, especially when it is remembered, that the quality of water used is immaterial to the success of operation, a source of such frequent trouble in neighborhoods where hard or dirty water prevails.

Mr. Albert G. Smith, agent of the Grant Yarn Co. of Fitchburg, Mass., gave some interesting facts and figures in connection with this form of power and the very satisfactory experience with it at the Grant Mill. Mr. Smith said:

In presenting a few words in discussion of this paper I wish to compliment Mr. Tait upon giving us, as power users, some interesting figures and to fully agree with him that he has outlined an economical power. It is without question far cheaper than steam and the only thing I know of in manufactured power which competes with it is an internal combustion engine of another type, viz: the fuel oil engine. If as Mr. Tait says the Producer Gas plant has ceased to be on an experimental basis and the element of unreliability thereby eliminated there is certainly nothing better for small power than the internal combustion engine. The cost of operation is low, the care and attention required a minimum and the plant is ready to start at a moment's notice.

In comparing the Producer plant with steam, although the gas plant shows an increase of 100 per cent. or more over the efficiency of the best steam installation, when taking into consideration the thermal units producing useful work, the cost of power is not correspondingly less. When reduced to dollars and cents this decrease in cost will be found to be not over 33 per cent. for medium powers.

Since we are discussing power from internal combustion motors it may be of interest to note a few figures from an oil engine plant. At the Grant Yarn Co. we are operating 450 h. p. of Diesel engines and I thing we can show a cost favorable in comparison with Plant No. 4, one of the most economical of the plants mentioned by Mr. Tait, and supporting my previous statement concerning the economy of the fuel oil engine. Our cost of operation is as follows:

Fuel	.203c. per net brake h. p. hour
Repairs and supplies	.025c. per net brake h. p. hour
Labor	.128c. per net brake h. p. hour
Total	.356c.

We run our plant 130 hours per week against about 160 hours shown by Plant No. 4 and included in our figure is an additional labor charge on account of carrying part of the wages of a spare engineer not necessary for the operation of the plant.

Let us compare these figures with Plant No. 4. That the comparison may be fair we should put our Diesel figures upon a basis of a 24-hour 7-day run with labor in three shifts. Our fuel, supplies

and repair charges would remain practically the same. The necessary increase in number of attendants would raise our labor cost to .14c. On the other hand we would need to move Plant No. 4 to Fitchburg, Mass., and we would find that on account of higher freight rates our fuel account would materially increase. The freight on Illinois slack would be prohibitive and if we used this grade of fuel it would probably be a Reynoldsville slack which costs at the mines a trifle more than the Illinois. This coal landed at Fitchburg would cost in the neighborhood of $4.00 per ton against about $1.50 the cost as shown at Plant No. 4. At Fitchburg therefore the fuel cost of Producer Gas under condition of Plant No. 4 would be .226c. instead of .085c. The other charges would remain the same. Our comparison follows:

	Per brake h. p. hour.	
	Diesel Plant.	No. 4 Producer Plant.
Fuel	.203c.	.226c.
Repairs and supplies	.025c.	.063c.
Labor	.140c.	.184c
Total	.368c.	.473c.

If we should take into consideration depreciation charges we would show a still further gain of several points in favor of our Diesel installation.

The last paper read was:

Tcchnical Education: Its Functions in Training for the Textile Industry.

CHARLES H. EAMES, Lowell, Mass.

While the iron, steel, electrical, and chemical industries are more dependent upon scientifically trained managers, the textile, an older and more conservative industry, is fast finding the same need. Some years ago a treasurer of a successful mill was heard to remark with a sneer, "I don't want any Technology graduate coming down here in his patent leather shoes and telling me how to run a mill." The silent reply to this man's belittling estimation of technical education may be found by comparing the change in market values of his mill stock and that of a mill which has made a practice of employing an increasing number of M. I. T. graduates. The stock of the former has constantly fallen until it is nearly one-half its original value and below par, while the latter has constantly advanced until a share is now worth more than three times its par value.

We hesitate to resort to statistics for they do not always tell the whole story. They are nevertheless some measure to use in estimating the results. If our summarization from the catalogue of the Massachusetts Institute of Technology be correct there are considerably more than a hundred of the graduates engaged in the textile industry or in a business directly dependent upon the textile industry. This does not include those who are mill engineers, or those in steam, hydraulic, or electrical machinery design and construction, whose products enter to a great extent in the success of textile maunfacturing. Neither does this figure, of course, include those who are not graduates, but who have found profitable positions in the textile field and are surely exerting intheir influence and helping to make technical training felt in the industry. It would be necessary to consult the alumni lists of the other technical schools to gain a fuller appreciation of the increasing value placed by the textile industry upon this department of education. Further than this in making up our account we should not forget to give due credit to the fact that the industry has deemed technical education of sufficient importance to establish special schools that its particular requirements may be better met. In one of these schools four Massachusetts Institution of Technology men are on the instructing staff, and there have been connected with the school during its brief existence nine instructors who received their training at the Massachusetts Institution of Technology, and who in turn are bound to instill into the training of their pupils much which cannot better be described than "Tech. spirit." On this same instructing staff have been graduates from at least ten other technical institutions, which fact serves as another example of the extended influence of textile industry.

One could hardly conceive of the increase in active cotton spindles in the United States of from 2,500,000 in 1860 to over 29,000,000 in 1910, accompanied by an increase in the consumption of cotton from 840,000 bales to 4,500,000 during approximately the same period without realizing that engineering in the designing, constructing and operating of the cotton mill must play as ever increasing part. In comparing the size of the woolen mill of 1860 with the magnitude of the present day worsted mill plant of the type of the Arlington, the Ayer, or the Wood, one has some appreciation of the engineering problems involved and the training which has made the successful solution possible.

The increase in production with demand for improved efficiency naturally places problems of improvements in machinery upon the builders, and they too have found the need for special trained men of technical preparation. Hardly a machine shop building textile machinery can afford to be without its corps of expert engineers. The decrease in pounds of cotton consumed per active spindle may be taken as an indication that finer grades of material are being manufactured in this country, and this too will bring its more complex problems for the manufacturer and designer of machines.

Within the past few years we have learned of a new kind of engineer, or better, an engineer with a new title, indicating again the further subdivision of the field of industrial training. While it was undoubtedly one of the recognized tenets in the establishment of the technical school that increased efficiency of operation would accrue, yet the field of the economist or efficiency engineer was nor conceived, but today manufacturers are realizing more and more that dividends can be made or lost in the waste, not only of materials but by the improper direction of labor. The time element in production demands in many cases more consideration than the material, and the efficiency of a human being or process must be and is determined with almost as great an accuracy as any mechanical or electrical device. The industries working upon the smallest margin of

profit find the greatest need for this engineer. One of the most lucrative fields for him is the textile, and if careful examination were made one would find many of the successful mills quietly employing engineers with broad technical training to study their plant, methods and employes that the efficiency of all of these elements may be made the highest.

The technically trained chemist is more and more in demand by the textile industry. His chief work is to increase the efficiency by insuring the quality of the raw material, by reducing the cost of manufacture, and by reducing waste or redeeming valuable by-products from this waste. The chemist's work has prevented the increasing amount of refuse from the textile mills from polluting the water supplies of nearby communities. Thus while he may not in such cases be engaged to directly improve the industry, he has made it possible for business to expand without being a menace to any particular locality. Logically then we should add to the number of Massachusetts Institute of Technology graduates earlier referred to, as connected with the industry, those who as consulting chemists or as employes of the various Boards of Health are helping to promote indirectly the textile industry.

The increasing quantity of colored goods produced in the United States with the range of dyestuffs made possible by the development of coal tar products, coupled with the impure water supply, shows another pressing need for the technically trained chemist. The day of the "rule-of-thumb" dyer with his stereotyped receipts applied with little regard for varying conditions is fast receding. The dyer finds a knowledge of the fundamental laws of chemistry an absolute necessity in coping with the perplexing problems of more intricate dyesutffs, complexity of material and contaminated water supply.

Germany is a recognized leader in the manufacture of dyestuffs and chemicals. The early introduction of her products to this country required her own experts as demonstrators, but only recently a technically trained chemist in the employ of one of these importing houses was heard publicly to state that the German experts here were no longer required for their places in this country are being taken by our own technically trained chemists. This means but a step toward the increase of dyestuffs manufacture in this country.

The tendency of larger growth of the textile industry with its dependent branches has been indicated and I have endeavored to show that technical training is to be a pre-requisite for success. If this condition of affairs be accepted certainly one of the most attractive fields is open for the further application of scientific laws and principles. A few of the early graduates of Technology have entered textile manufacturing, but nearly every one of the later classes has added some new representative. The fact that the earlier graduates secure these later class men to fill positions may be taken as an indication that the expansion of the Textile Industry has opened a new field where there is an ever increasing demand for the graduate with a technical education.

An interesting question was extracted from the question box on the platform and although no one present seemed to be in a position to answer it offhand, it will no doubt receive attention, as the facts ought to be readily ascertained. The question related to the relative taxation of English and American mills, the inquirer believing that American mills were under a heavy handicap compared with their English competitors in this regard and he wished to know what the difference actually was in mills of similar size and on similar work in Manchester and in New England.

A telegram from the Chamber of Commerce of Atlanta, Ga., containing an invitation to hold a meeting in that city was read and referred to the board of government for attention.

The committee on resolutions reported the following:

RESOLUTIONS.

Resolved: That the President be and he hereby is requested to appoint a Committee of three, of which he shall be ex officio a member, to act in harmony with similar appointees from other organizations, for the consideration of the interests of our industry in case of tariff revision and allied subjects.

Whereas: Extreme and violent fluctuations in the quotations of the cotton option on the cotton exchanges are generally the result of extreme speculation, and are unfortunate in effect both upon the producer and the manufacturer; and

Whereas it is most important that there should be uniformity of relation between the prices of cotton options and spot cotton;

Resolved: First, That this Association records itself as believing that speculation in cotton should be limited in every legitimate way, and that purchases and sales on cotton exchanges should not be permitted where there is no true intent to deliver or receive, or where the operation is not a legitimate hedge.

Second, That this Association believes that the evils incident to speculation can be greatly relieved by the exchanges themselves through proper amendment of their rules.

Third, That the president of this Association appoint a committee to act in harmony with other interested parties to present to the cotton exchanges, and particularly to the New York Cotton Exchange, the necessity of an amendment of rules so as to make the contracts equally fair to both buyer and seller, and to make the options conform to spot quotations and values.

Resolved: That whereas this meeting is fully two weeks earlier than usual, the regular rules

for admission to membership to the Association be unanimously suspended, and that the Executive Committee be empowered to act upon applications for membership till May 15th.

Resolved: That this Association most earnestly requests that all foreign commercial agents and representatives of the federal government should be selected whenever possible from those who have a knowledge of the language and commercial customs of the country to which they are sent, and are conversant with the manufacturing interests of this country.

Resolved: That the thanks of the National Association of Cotton Manufacturers, as well as all users of water power, are due and are heartily accorded by the Association to Hon. John W. Weeks for his indefatigable and successful efforts in protecting, as far as practicable, by Congressional action, the forests at the head-waters of the navigable streams on the Atlantic Coast.

Resolved: That the appreciation of the Association be expressed to the Massachusetts Institute of Technology for its hospitality, and that the thanks of the Association be expressed to President Richard C. McLaurin for his cordial welcome.

Resolved: That the thanks of the Association be expressed to E. D. Meier, President, American Society Mechanical Engineers, and to the following non-members whose contributions have added so much to the pleasure of the meeting: James A. Lowell, Esq., Chairman, Workman's Compensation Commission; Mr. E. C. Smith, Hawaiian Islands; Mr. Henry G. Bradlee, Boston, Mass.

Chas. T. Plunkett, Chm.,
Harry W. Butterworth,
Lyman M. Cousens,
John E. Kendrick,
Lewis W. Parker,
William E. Hooper.

The following new members were unanimously elected:

HONORARY MEMBERSHIP.

Hon. John W. Weeks, West Newton, Mass.

ACTIVE MEMBERSHIP.

James W. Cannon, Pres. Cannon Mfg. Co., Concord, N. C.

Robert Chapman, Pres. Marlboro Cotton Mills, McColl, S. C.

Frank E. Dunbar, Pres. Boott Mills, Appleton Co., Atlantic Cotton Mills, Lowell, Mass.

Benj. Eastwood, Sec. Benj. Eastwood Co., Patterson, N. J.

Henry D. Emerson, Supt. of Mechanical Dept., Arlington Mills, Methuen, Mass.

Thomas B. Hitchcock, Asst. to Gen. Mgr. Consolidated Cotton Duck Co., 86 Worth St., New York City.

C. Egbert Hutchison, Pres. and Treas. Nims Mfg. Co., and Woodlawn Mfg. Co., Mt. Holly, N. C.

Joseph B. Jamieson, Jr., Supt. Grant Yarn Co., Fitchburg, Mass.

Ahira Baker Kelley, Buyer of Cotton, Bemis Bros. Bag Co., 40 Central St., Boston, Mass.

William S. Lee, Vice Pres. and Chief Eng. Southern Power Co., Charlotte, N. C.

Hamilton de Forest Lockwood, Asst. Treas. Pacific Mill, Boston, Mass.

William B. MacColl, Acting Gen. Supt. Lorraine Mfg. Co., Pawtucket, R. I.

Andrew E. Moore, Asst. Treas. Loray Mills, Gastonia, N. C.

Thomas F. Parker, Pres. Monaghan Mills, Greenville, S. C.

John L. Patterson, Mgr. Rosemary Mfg. Co., Roanoke Rapids, N. C.

Theodore R. Plunkett, Supt. Greylock Mills, Adams, Mass.

Frank B. Ricketson, Agt. Burgess Mills, Pawtucket, R. I.

John E. Rousmaniere, Asst. Mgr. Farwell Bleachery, 70 Kilby St., Boston, Mass.

Harold F. Sherman, Supt. Dudley Mills Co., Worcester, Mass.

James Sinclair, Treas. Charlton Mills, Fall River, Mass.

Aug. W. Smith, Pres. Union Buffalo Mills Co., Spartanburg, S. C.

Ellison A. Smyth, Pres. and Treas. Pelzer Mfg. Co., Greenville, S. C.

Irving Southworth, Supt. Cotton Dept. Pacific Mills, Lawrence, Mass.

Robert A. Sprowson, Supt. Fitchburg Yarn Co., Fitchburg, Mass.

S. B. Tanner, Pres. and Treas. Henrietta Mills, Caroleen, N. C.

J. F. Taylor, Treas. Kiniston Cotton Mills, Kiniston, N. C.

C. D. Tuller, Pres. Exposition Cotton Mills, Atlanta, Ga.

T. L. Wainwright, Pres. and Treas. Stonewall Cotton Mills, Stonewall, Miss.

Stephen T. Whittier, Asst. Gen. Mgr. Hamilton Mfg. Co., Lowell, Mass.

Harry Wylde, Supt. Pacific Mills, Print Works Dept., Lawrence, Mass.

Joseph T. Leach, Supt. Durfee Mill, Fall River, Mass.

ASSOCIATE MEMBERSHIP.

Theodore P. Bogert, Sec. and Asst. Treas. Manufacturers' Mutual Fire Insurance Co., Banigan Bldg., Providence, R. I.

Albert W. Danforth, Gen. Mgr. Thissell Co., Lowell, Mass.

Pardon N. Dexter, National Ring Traveler Co., Providence, R. I.

George W. Loggie, Treas. Kinkead Mfg. Co., Boston, Mass.

Ralph E. McCausland, Field Mgr. Barber-Colman Co., Rockford, Ill.

Walter K. Shaw, Member firm of E. A. Shaw & Co., Cotton Buyers, Boston, Mass.

Philip C. Sullivan, Metallic Drawing Roll Co., Indian Orchard, Mass.

Nathaniel N. Thayer, Member of the firm of Barry, Thayer & Co., Boston, Mass.

E. Beverly Walden, Gen. Sales Agt. Corn Products Co., New York City.

Secretary's Report.

The last year has been a most active one in the history of the Association, both in regard to its efforts and its accomplishments. The event of the most material value to the cotton manufacturing interests having been that of the passage of the Forest Conservation bill, and although the measure was not as complete as the original form, yet it will eventually be of the greatest value to all users of water power in protecting the headwaters of the Appalachian or White mountains, of navigable streams flowing into the Atlantic Ocean. The officers of this Association appreciated the importance of this measure from the first and advocated its passage as a purely business proposition, and they enlisted the efficient services of other associations whose members were users of water power in the territory affected. It is expected that the state of New Hampshire will materially cooperate by adding to the tract coming under the law, numerous other forest properties which are being rapidly denuded.

C. J. H. WOODBURY, SECRETARY OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

The whole community is deeply indebted for the passage of this legislation to the Honorable John W. Weeks, member of Congress, who has ably advocated and carried this bill through to enactment.

THE ASSOCIATION MEDAL.

The Association Medal for 1910 was awarded to C. J. H. Woodbury of Lynn, Mass., for his work

on the Bibliography of the Cotton Manufacture and also his contributions to the welfare of the industry.

THE STUDENT'S MEDAL.

The Student's Medals for the encouragement of textile education which is supported by a fund donated for that purpose by the late Moses Pierce of Norwich, Conn., in commemoration of his ninety-second birthday, July 3, 1900, have been awarded during the year to Thomas Bryan Summerlin of Mount Olive, N. C., a graduate of the Lowell Textile School; Edgar Walker Harris of Rockwood, Ontario, Canada, a graduate of the Philadelphia Textile School, and William Oscar Jelleme, 95 La Fayette St., Passaic, N. J., a graduate of the Lowell Textile School.

Under the present conditions of awarding the medal, as was adopted by the Association in 1907, medals be given this year to students of highest record in the graduating classes at the Lowell Textile School, Philadelphia Textile School, the Bradford-Durfee Textile School and the North Carolina College of Agriculture and Mechanic Arts.

The Association has received a large number of applications from other textile schools to give some other form of recognition than a medal to their graudating scholars of highest standing, but the Board of Government have reported that they have no right to deviate from the conditions of the Student's Medal on one hand, nor is there any other provision for making awards to textile schools on any other basis than already adopted by the Association.

The conditions of the textile medal are not merely limited to those of a good scholarship of the recipient, but it also includes a measure of the course of study which is given by such an institution and it is to that extent a testimonial both to the student and to the school.

During the year the Association has called attention to these textile schools the importance of instruction in textile French and German because in the case of mills outside of those manufacturing plain cotton goods, the character of the product and the resultant benefit to the mill is largely a question of dyeing and finishing, and the majority of works on those subjects are in French and German. There are, it is estimated, about 700 such technical, textile terms in German and about 500 in French.

Many such mills have in their service one constantly examining foreign periodicals for matters of possible benefit to the mill, and the ability to read such technical works which are far from the general literature in those languages, would tend to make a txetile school graduate useful in a mill from the first.

These suggestions from the Association have been cordially received and one school is believed to give its instruction on that basis at the present time.

THE ASSOCIATION SCHOLARSHIP.

The Association Scholarship at the New Bedford Textile School founded on the donation of William Firth, Esq., became available during the year and the Board of Government nominated George O. Castle of Waterbury, Conn., from among numerous applicants for the position. This nomination by the Board of Government is always made subject to such rules for examination and maintenance of standing as the New Bedford Textile School may adopt for all students taking the full cotton course.

COURTESIES FROM OTHER ORGANIZATIONS.

The Association receives a large number of invitations to join in various commendable movements, many of which pertain to the indirect interest, at least, of its members, but the Board of Government has continued the conservative policy of avoiding anything approaching affiliations with other organizations; however, the Board of Government authorized the acceptance of three of those invitations.

The International Conference of Master Cotton Spinners' and Manufacturers' Associations was held at Brussels, June 6-9, 1910, and ex-President James R. MacColl served as an unofficial delegate of this Association, as he has done on many previous occasions. The Association has been invited to send delegates to the forthcoming conference to be held at Barcelona, May 8-11, 1911.

The invitation of the American Academy of Political and Social Science for the Association to send delegates to its meeting at Philadelphia, April 7 and 8, 1911, devoted to Risks in Manufacturing, was accepted, as it was believed that the public at large have but little appreciation of the great extent of the precautions which cotton manufacturers and also cotton machinery builders have always taken for the protection of their employes in advance of legislation on the subject and Messrs. George V. S. Michaelis, and Edward W. Thomas were appointed delegates.

PAPERS BEFORE THE ASSOCIATION.

The meetings of the Association on their general lines are arranged a year in advance, but the arrangement of papers before the meeting of the Association presents a number of diverse conditions and problems. A great many papers are offered and when the time comes for their presentation for the usual advance printing for the convenience of the members, it is found that other engagements of life have stepped in the way of their preparation and at times when the program of the meeting has been prepared in detail months in advance, as for instance the program for this meeting was made last December, for the purpose of giving to the members a variety of topics, some of which would appeal to every one present, it is found that other arrangements must be made and the Association has been at times under great obligations to members who have furnished papers at very short notice to fill gaps in the program which have occurred but a short time before the meeting.

The general conduct of papers presented at the meetings of the Association has of late years been under the arrangements made by a committee who reported on the subject May 13, 1908, in compiling the precedents of various votes of the Association and of the Board of Government since February,

1890, at which time the records were destroyed in a fire which burned the building in which the office of this Association was situated at that time, and the committee also made investigations upon the methods used by various other technical organizations. Since August, 1894, and probably before that date, the program of every meeting has been based in detail upon the action of the Board of Government and its confirmation made by the same authority before promulgation, excepting in connection with emergency papers to which reference has been made above which have been under the jurisdiction of a committee of the Board of Government.

The result of this cooperation of many minds upon the subject has been that every program since the fall of 1894 has been fully carried out as printed, with the exception of one paper at the meeting held in September, 1910. The Association has been at times glad to avail itself of the opportunity to receive papers from specialists whose other relations were such as not to bring them within the technical qualifications of membership, but all such papers by non-members have been read upon invitation of the Board of Government.

THE BOARD OF GOVERNMENT.

The Board of Government has held five meetings during the year, one of them being at New York City, on October 16, 1910, where various lines of policy in connection with the Board of Governors of the American Cotton Manufacturers' Association were discussed and consisted of an extended conference upon lines of policy for the improvement of the cotton manufacture. On February 2, 1911, the Board held a conference at Washington to which were invited the officers of The American Cotton Manufacturers' Association, the Arkwright Club and the Farmers' Cooperative and Industrial Union. Matters of interest and importance to the cotton manufacture, particularly in regard to raw material, were thoroughly discussed and several joint committees appointed, whose reports will be presented to a future meeting of this Association, when they are received.

It has been feasible this year to extend the work of the Association through committees, some of which have been continued from the former meeting and from whose work it is expected that all will receive valuable advantages in time to come.

MEMBERSHIP.

The following members have died during the year: C. F. Burnham, E. G. Chester, Charles H. Child, W. T. Galey, Gideon F. Holmes, Edwin T. Marble, Haven C. Perham, Joseph H. Potter, Jr., Charles K. Oliver and Walter H. Summersby, of whom memorial sketches will appear in the volume of Transactions forming a record of this meeting.

The mutations of membership during the year are shown by the deaths of 10, the resignations of 16, and the dropping of 7 for non-payment of dues. The membership, April 1, 1910, was 979, to which should be added 100 elected during the year and from which should be taken the loss of 33 from the various causes mentioned above, leaving the net membership on April 1, 1911, as 1,047, to which should be added the number to be elected at the forthcoming meeting, bringing the membership May 1, 1911, up to ——— (figures will be supplied in the transaction).

The Association has held as usual, two meetings during the year, one at Boston, April 27-28, 1910, and one at Hotel Wentworth, near Portsmouth, N. H., Sept. 15-17, 1910.

The election of officers resulted in the unanimous choice of the following for the ensuing year:

For President—Franklin W. Hobbs, Brookline, Mass.

Vice Presidents—Edwin Farnham Greene, Boston, Mass.; Frederick A. Flather, Lowell, Mass.

Directors for three years—William Amory, Boston, Mass.; Frederick B. Macy, New Bedford, Mass.; W. Frank Shove, Fall River, Mass.

Director for one year (To fill unexpired term of Mr. Flather)—William N. Kimball, Woonsocket, R. I.

One feature of the meeting that demands special praise was the work of the committee on the meeting. Seldom has there been a meeting in Huntington Hall so free from noise and disturbance due to frequent entrance and exit of the members. The result was that those who were interested in the papers were not disturbed and the meeting was pronounced on all sides to be a great improvement in this respect. The attendance of manufacturers in the hall was larger than usual and the interest in the papers and discussions that followed showed that the selection of papers appealed to the manufacturers and reflected good judgment on the part of the governors.

President Hobbs confirmed the favorable impression made at the autumn meeting at Portsmouth as presiding officer. His tact, graceful introductions and contributions to the discussions added not a little to the meeting.

Much credit for the success of the meeting is due to the efforts of the board of government, the special committee on the meeting, comprising Messrs. Henry C. Dexter, chairman, Wm. Amory, Wm. L.

Lyall, John P. Marston, Geo. M. Montgomery, Robert W. Neff, Edward W. Thomas and William T. Westerman, and as usual to the untiring efforts of Secretary Woodbury.

THE PRICE-CAMPBELL COTTON PICKER.

In connection with the exhibition of the Price-Campbell cotton picking machine on the lawn of the Massachusetts Institute of Technology, Theodore H. Price, of New York, gave a banquet at the Hotel Somerset on April 12th, about two hundred guests being present. After the banquet a test of the machine was made in the ball room, it being run around the room, picking cotton and avoiding the leaves, flowers and other vegetation which had been set in rows for the test.

Booker T. Washington was the principal speaker. The others included Mr. Price, Franklin W. Hobbs, John Graham Brooks, Moorfield Storey, James R. MacColl, M. H. Thomas, of Dallas, Texas, and E. A. Calvin, of Houston, Texas. All present were deeply impressed with the work of the machine. Mr. Washington said that instead of injuring it would be a benefit to the black race, as it would enable the women to escape the drudgery in the fields and make a real home for their families. Moving pictures were displayed during the banquet showing the work of the machine in the southern cotton fields.

On Thursday as the manufacturers assembled at the Institute Building, their attention was attracted to a handsome automobile truck piled high with compact bales of Egyptian, China and Indian cotton, imported by L. H. A. Schwartz & Co. of Boston. The contrast with the ordinary American bale was an object lesson on the baling question. These large importers of foreign cotton chose a very practical and forceful way of calling attention to their facilities.

The United States imported thread and yarn to the value of $4,317,788 during 1910, and exported the same class of goods to the value of only $463,404.

TESTIMONIAL DINNER TO WILLIAM WHITMAN.

A number of Massachusetts business men represented by a committee covering the different important branches of business, are tendering a reception and dinner to Mr. William Whitman on April 26th in recognition of his service as a builder up of the important textile industries of Massachusetts and as a public spirited citizen of the Commonwealth. This dinner will be held at the Hotel Somerset at 7 p. m. and be preceded by a reception. John P. Wood, president of the National Association of Wool Manufacturers, will preside, the Hon. John D. Long will be toastmaster and among the speakers expected will be Gov. Foss, Mayor Fitzgerald, William M. Wood, Samuel M. Powers and Geo. S. Smith, president of the Boston Chamber of Commerce. The committee on arrangements is composed of John Hopewell, Chas. W. Leonard, Jacob F. Brown, Frederic C. Dumaine, Philip Stockton, Edwin F. Greene, William H. Wellington, Chas. H. Hutchins, James M. Prendergast. Winthrop L. Marvin, 683 Atlantic Ave., Boston, is the secretary.

A large number of prominent men of New England have signified their intention of being present.

Charges for Transferring Commission Accounts.

Editor Textile World Record:

We are transferring our mill account from one commission house to another and would like to know what charges are usually paid to the old commission house in connection with such a change. No advances have been made on our goods. Commission (1273).

This inquiry was referred to an experienced commission agent, who replies as follows:

It is customary to charge 1 per cent. transfer charges on goods not advanced on, and in case of advances having been made the custom is to charge 2½ per cent. on the amount of advances in addition to the 1 per cent. on the total value of the goods. These charges are generally objected to and in order to avoid bad feelings the charges are frequently not made. Macbeth.

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

Waterproofing Braided Cord.

Editor Textile World Record:

Kindly send recipe for waterproofing braided cotton trolley and tiller cord like enclosed sample; also the way to use it. Fairfield (1260).

The waterproofing of trolley and tiller cords is done in two ways, first by proofing the yarn before braiding, or by braiding first, then subjecting its cord to the proofing process. In either case, several methods may be employed.

Proofing of cotton yarn is extensively done by impregnating with a solution of acetate of alumina made by dissolving 30 lbs. alum in 50 gals. of water, afterwards adding 30 lbs. sugar of lead, heating by means of steam until no lumps remain, allow to settle, using the clear top-liquor. After soaking the yarn in this solution for two hours it is lifted, drained, and passed through a weak soap solution, which causes a deposit of an aluminate of the fat of the soap in the yarn. Such yarn when dried is water-repellant.

Another method, using alum and glue, is as follows: 50 lbs. of alum is dissolved in 500 lbs. water, 50 lbs. of blue is soaked in 10 gals. of cold water over night, in the morning heat to boiling and when solution is complete stir in 2 1/2 lbs. of tannic acid and 1 lb. silicate of soda, and add the entire quantity to the alum solution, mix thoroughly, cool to about 170° F., enter the yarn and allow to remain immersed until saturated, finally squeeze and dry.

An excellent waterproofing medium, and which perhaps has no superior is a mixture of rubber and paraffine wax. It is not only waterproof but an excellent insulator. Five pounds of paraffine wax is melted in an iron pot, add 1 1/4 lbs. of scrap rubber and continue heating until the rubber is dissolved, allow to cool and solidify, then cut up into blocks for use. The material to be proofed, whether yarn or cable, is weighed in the dry state, and for every 8 pounds allow 1 gallon of benzine in which is dissolved 3 ounces of the above paraffine-rubber mixture. The material to be proofed is immersed in this solution which soaks it up in a very short time, after which the benzine is allowed to evaporate, leaving a thorough waterproof deposit on the material treated. If cable has been so treated, a finish may be imparted to it by passing it between heated grooved rollers. In some works the cable is rubbed with paraffine wax before going through the rollers. Effective waterproofing of cables is also done by drawing the cable through melted paraffine, which is kept melted in a long, shallow pan, the cable being kept below the surface by guide rollers. The cotton fiber trap, and the capiliarity of the cable cause an almost immediate soaking up of the melted wax. The cable, upon leaving the pan of wax, is drawn between wipers, then through grooved finishing rollers, and finally coiled. Beta Naphthol.

Treatment of Mercerized Yarns.

Editor Textile World Record:

Will you please tell me whether there is any treatment to which the product made from mercerized yarns can be submitted so as to take off the gloss, and give it the appearance of a product which has not been mercerized?

Wentworth (1278).

Owing to the treatment through which yarns pass in order to be mercerized, and the physical changes which the cotton fiber suffers, due to the action of the caustic alkaline solution used, it is impossible to treat such yarns so as to "kill" the luster. Further, no substance can be successfully applied to

mercerized yarns or fabrics that will deaden the luster without impairing the handle or "feel" of the goods and which would be at the same time permanent. Berwick.

Sizes of Men's Union Suits.

Editor Textile World Record:

Can you give me the latest sizes for men's union suits? Weymouth (1281).

It is impossible to fit all men from any line of combination suits. Given two suits the same size, one can take two men and fit them perfectly so far as the body is concerned, and at the same time find that either the legs or the arms or both may be too long for one man and too short for the other. So long as men do not grow uniformly, so long will it be impossible to fit every figure with suits made uniformly. The most progressive manufacturers have determined upon their scale of measurements by measuring hundreds of figures and striking an average.

Since publishing the scale of sizes last year it has been found that improvements could be made and that a larger number of men can be fitted from suits made after the following scale:

Width		Center Shoulder to Crotch	Length Sleeve	Inseam	Width of Leg
34	13	29	19	26½	6¼
36	14	30	20	27½	7
38	15	31	20	29	7½
40	16	33	21	29	8
42	17	34	21	28	8½
44	18	35	22	28	9
46	19	36	22	28	10

Meaning of the Term to "Cobble."

Editor Textile World Record:

What is the meaning of the term "cobble" when applied to dyeing? Rochester (1267).

"Cobble" is a term very generally used by dyers to signify "mend" or "repair." In case of a lot coming up off-shade the dyer will say, "Oh, they can be cobbled up all right. A touch of pink is all they want." In their haste to get the work through, some dyers rely on a final cobbling to get a difficult shade, rather than on care in the first instance. Some of the old-time dyers with an exceptional eye succeed fairly well in avoiding the necessity of cobbling, although they court the risk of it and sometimes make messes which cannot be cobbled. Broadly then, cobbling means topping or tenting or redying to produce a correct match. The word "blocking-up" applies to slubbing or loose material. The dyer bangs away at the first 900 out of a 1,000 pound lot, getting a hit or miss result. Then he "blocks-up" the whole by dyeing the remaining 100 pounds to that tone which, when mixed evenly with the bulk, will produce the required effect.

No doubt both practices are wrong and the extensive use of them in this country (England) is clearly traceable to low prices for dyeing. The man who is working on the uttermost limit of profit does not feel that he can keep men and machines standing while he makes elaborate trials. In the beginning of a season the attempts are worse than later on, because as time passes the dyer gains experience on the fashionable shade. There is a lot of luck in this snap-shooting of shades. For a while an experienced man gets home on every attempt and then for a week or two his luck deserts him and there is a very fine bill to pay for damaged goods.

Regent.

"Balloon" Yarn.

Editor Textile World Record:

We want to produce an exceptionally full, bulky, lofty worsted yarn, twofold. What twists do you recommend? Dumas (1269).

Perhaps the inquirers want what is known as a "balloon yarn," which is not to be produced in its perfection by the ordinary means of slack twisting. A method of making this has been described by a spinner who devoted a great length of time to experimentation and who has often been called in to advise in cases of difficulties. He found an English spinner struggling to make a yarn as described and getting only poor, lean results. The man had used five turns in the single and the advice given was "use four." He had given three twists to the twofold and with reluctance and under persuasion gave nine. He then scoured the sample, and in obedience to instruction took five of the nine turns out. The outcome was a rich thread absolutely bursting with fullness and this may be the effect "J and K" seek. At any rate they might try the experiment, adjusting the twists to their own special needs.

Argus.

Finishing Sewing Thread.

Editor Textile World Record:

Many manufacturers have difficulty in sizing yarn for thread purposes so that it will not be too wiry. I wish you would publish an article on the best methods of sizing such thread, treating of the mechanical as well as the chemical side of the process. We enclose a sample marked "A" "not filled" and a sample marked "B" "well filled." The sample marked "B" is well filled and still very pliable, holding the finish in good shape. The other marked "A" does not make as round a thread. We would like to have you treat of the cause of such difference in the finish, giving directions for making the finished yarn pliable and elastic. Wyoming (1277).

This is a matter on which those in the best position to know are very reticent and about which definite information is not easy to give. There is no fixed standard of finish and no two makers' results are quite alike. I owe to a friend suggestions on the definite points raised. The wiriness to which he objects may probably be overcome by the addition of a softener to the sizing composition. A small quantity of glycerine is recommended.

Sample A, it is suggested, may owe its flatness to the winding-on operation. The thread looks as though the pressure of the thread-guide had been too heavy. The elasticity of the thread is not entirely a matter of finish, but depends greatly on the class of cotton used in spinning. British thread-makers pay great attention to the selection of their yarn. Slight differences in the rate of drying have important effects on the stiffness of the finish and it is not considered right in this country to allow heat from the steam pipes of the polishing machine to escape into the general atmosphere of the room. Slight differences are important at all points. To quote one of the principal makers of thread-polishing machinery: "It is well known that to polish a boot too much as well as too little moisture and friction may be applied. A shade either way may alter the effect entirely. The homely accomplishment of blacking and polishing a boot well bears striking analogy to the correct polishing of sewing thread. The thread, according to its thickness and the luster desired, must be treated with careful attention to four points:

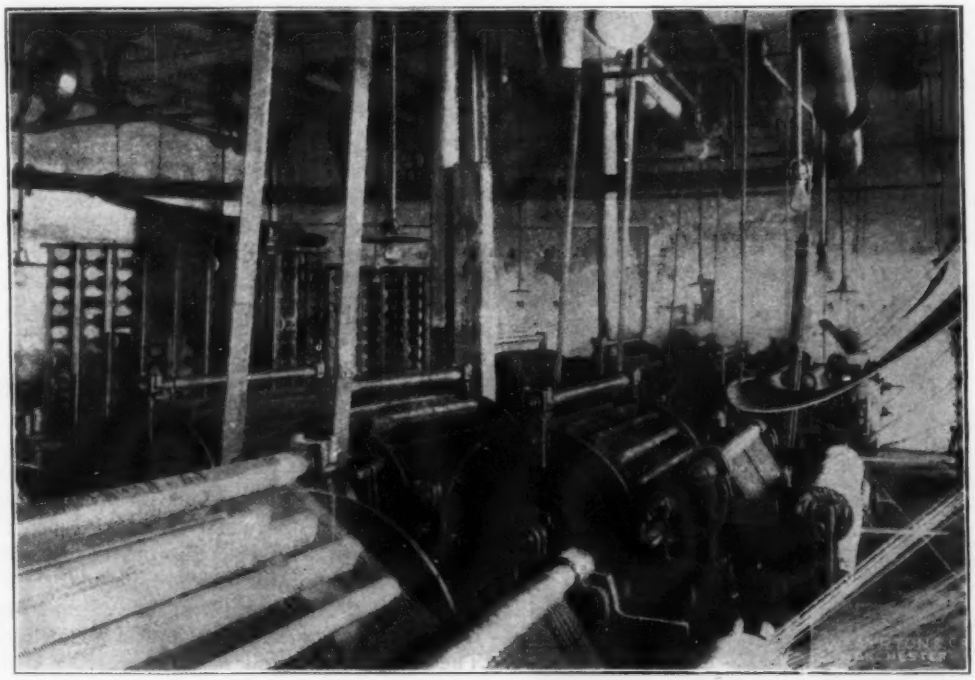


FIG. 1. FINISHING SEWING THREADS.

"Correct sizing, exact tension and exact brushing and drying. A varying treatment will produce unsatisfactory results. The natural rotundity and elasticity of the thread must be preserved, while the smoothness and softness of polish are essential for the success of any thread when tested by the sewing machine." This news, if rather in the nature of counsel of perfection than of direct information, at least emphasizes the importance of small points.

As to "correct sizing" I am told that bees-

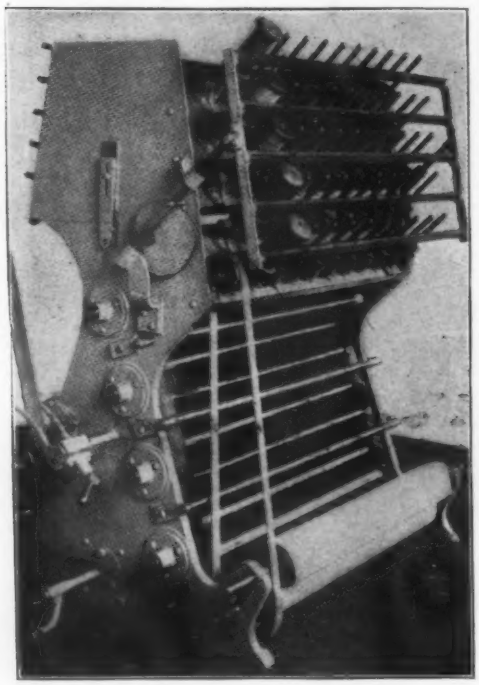


FIG. 2

wax and gum arabic are necessary ingredients to obtain brightness on black thread. By permission, I quote the "Cotton Year Book, 1911," for some recipes which may tend in a useful direction:

"Gray Thread Polish:—16 gallons (160 lbs.) of water at 170 F., 9 lbs. starch mixed in cold water, 1 lb. yellow wax. For a bright polish add another gallon of water at 170 F.

"Black or White Thread Polish:—15 gallons (150 lbs.) of water, 7 oz. white soap, 16 oz. hard paraffin. Boil until well dissolved, add 9 lbs. corn starch, previously mixed to a thin pulp. Boil until well mixed; cool and use.

"White Sewing Cotton Polish:—16 gallons of water, 6 lbs. starch, 6 oz. white wax, 5 oz. yellow wax, 7 oz. pale white soap and 2 oz. spermaceti. Take water at 175 F. and stir in the soap in slices; mix the starch in cold water; pour in the starch into the boiler and add the waxes."

Upon the mechanical side of the problem the importance of small adjustments has already been mentioned. The choice of machines for doing the work is governed by individual considerations. When the thread has been dyed in the hank a bobbin-to-bobbin system of sizing and polishing is used in this country (England) and a beam-to-bobbin system for warp-dyed yarn. For dealing with small lots to a color there are small machines. W. Ayrton & Co., Manchester, make 32-end, 50-end, 98-end, 200, 300 and 360-end machines for glacé polishing. W. McGee & Son Co., Paisley, build 100, 200 and 300-end machines for bobbin-to-bobbin and 300-end for beam-to-bobbin. The larger types, Fig. 1, have either a beam-stand or a creel, an adjustable size-box, felt-covered iron squeezing rollers and three bristle-covered polishing cylinders and hardwood beaters. Ground brass rollers with a reciprocating motion serve as thread-guides and regulate the contact between thread and brushes. Steam heat is used in drying, metal rollers in burnishing. The drawing-off rollers are adjustable according to the counts of the thread and the polish required.

A more compact form, Fig. 2, is adopted for the 50-end machine, the thread passing down from the winding-off bobbin into the size trough at foot, through squeezing rollers and under thread-guide rollers upon the five polishing cylinders. The thread may be set to run straight through or may be deflected back over a guide roller to receive extra polish.

Enough has been said to show that the opportunities of making slight differences by mechanical means are very numerous. Only experiment can tell which change to make to effect the required result.

Wessex.

Bleaching Knit Goods.

Editor Textile World Record:

I am enclosing two samples of knit goods. Both pieces were bleached with chlorine made from an electrolizer. I boil off for five hours in a Jefferson kier, using 2 per cent. bleaching assistant, 1 per cent. caustic, ¼ per cent. Turkey red oil, rinsing in a kier for one hour. I then take the goods out and wash in a machine for one-half hour in hot water, then in cold water, then run them in the chlorine liquor for one hour at 2° Tw. Rinse in cold water for 20 minutes, sour in 5 per cent. antichlorine for 25 minutes, rinsing thoroughly. Blue and take out, extract and dry in a Hurricane dryer at a temperature of 120° F. After the goods lie around for a few days they turn yellow. I also have the same trouble with my heavyweight goods.

Duplan (1276).

The electrolizer chlorine bleach is very popular and very good. "Duplan's" trouble may be in the bleaching. Another hour would do no harm. It is best not to use any Turkey red oil, as the oil retards the action of the caustic on the goods. The bleaching assistant, if it is a good one, should serve the purpose that the oil is used for. It seems to me that the chlorine bath is a little strong at 2° Tw., and would tend to force a white on the goods. It would be much better and cheaper if "Duplan" used the chlorine bath a little weaker and let the goods lie a little longer, instead of forcing them, as our hour is not long enough for the chlorine to do its work. If the goods are thoroughly bottomed in the boil for one hour, or the chlorine bath is too short, use the chlorine at 1° Tw. and leave the goods in longer, as 1° is strong enough unless the goods are very heavy. It seems to me that the antichlorine is not strong enough, otherwise the goods are not long enough in this bath to neutralize the chlorine in the goods. This will produce the trouble "Duplan" is having. The drying at 120° is all right, and the goods should be soft when dried at this temperature. If "Duplan" will try the following process for one batch of goods I am sure his trouble will disappear:

Boil for 6 hours with

2 per cent. bleaching paste
1 per cent. caustic soda
1 per cent. soda ash.

Leave out the oil. Follow the usual process as to washing the goods, using the chlorine at 1° Tw. and let the goods lie a little longer than before, or until they are a good white. The antichlorine used, whether it be muriatic, acetic or sulphuric acid, should be tested and used about ½° Tw. stronger than the chlorine bath, leaving them long enough for the acid to neutralize the chlorine in the goods. Then wash and blue the goods and dry as usual. A lot of trouble in bleaching yarn, knit goods and piece goods is caused by rushing in the process to keep up the production and to keep down the cost, at the same time sacrificing the finish. Alpha.

Bradford Numbers for Tops.

Editor Textile World Record:

I wish you would state for me the connection between the Bradford numbers, 40s, 60s, etc., used as quality numbers for tops and wool and the yarn numbers to which these designations will actually spin. A friend says Bradford sixties tops will produce a 60s 2-fold yarn. I know he is wrong. Andrews (1223).

This question was answered in our December, 1910, issue, but our English correspondent sends us the following additional information:

During 1907-8 an attempt to define details of the quality of Bradford tops was made by the staff of the Bradford Technical College. According to a table published in the quarterly report of that institution in April, 1909, the counts of yarn to which Bradford tops will usually spin are as follows:

Quality No. Tops.	Yarn Count Limit.
28s	16s
32s	24s
36s	28s
40s prepared	36s
40s carded	32s
44s prepared	40s
46s	40s
50s	44-46s
56s	48s
58s	50s
60s warp quality	48-50s
64s	56s
70s	80s
80s	100s
90s	150s

The table was compiled by Edford Priestley after experiments with a large number of samples with the idea of offering "a means whereby within reasonable limits" standards may be defined. In other words, the figures give a fair average which is not binding on anybody, but which is commonly attained in practice. Regent.

Machinery for Tinsel Chenille.

Editor Textile World Record:

Where can a machine for the manufacture of tinsel chenille be purchased?

Plymouth (1153).

Our French correspondent sends us this reply: The sample of chenille is made by the ordinary process of weaving and in the same manner as the wool chenille used in the patent Axminster carpets. Fig. 1 shows the texture, which is the ordinary leno weave. Thread 1 is 3-ply cotton. Thread 2, which is fine brass wire, intersects the filling the same as thread 1. Thread 3 is cotton like thread 1 and the brass wire, 4 is run with thread 3. These 4 threads working together are passed through the same dent in the reel. The height of the chenille is determined by the distance between the consecutive groups of threads which, in this case, is 1 1/2 inches. The filling, A, is tinsel and in weaving it is necessary to use a shuttle in which the bobbin turns as the metal thread is drawn from it. After weaving the fabric is cut along the dotted lines. This cutting is usually done by machine. The fabric passes under a horizontal shaft on which are steel discs set at intervals to suit the width of the chenille to be cut. The chenille thus obtained is flat. It is necessary to twist it in order to make it round. Fig. 2 shows how this is done. Because of the brass wire, 2 and 4, Fig. 1, the ends of the tinsel filling are held firmly in position before the second twisting which is done by hand with the aid of the passementerie wheel, shown at Fig. 3. This device, which is very old, has 8 to 10 spindles, 1. These spindles are driven by a cord which passes from the sheave pulley over the whorls. One of the ends of the chenille yarn is fastened to the spindle, 1, the other end is held by a pair of pincers. These pincers are mounted on a small weighted carriage which serves to compensate for the loss of length during twisting. The distance between the bobbin and the pincers depends, of course, on the length which it is desired to make the chenille. It is evident that this process could be improved, but as the demand for round chenille is very limited the manufacturers have not seen fit to adopt improved methods.

Gaul.

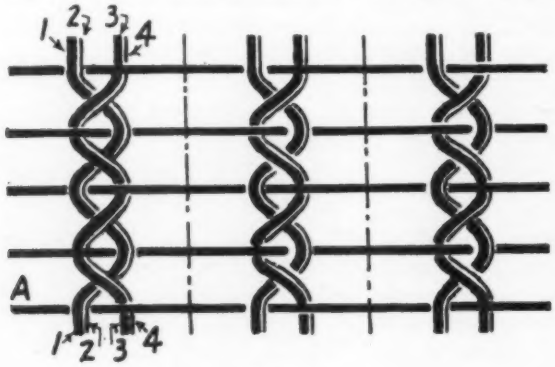


FIG. 1

FIG 2.

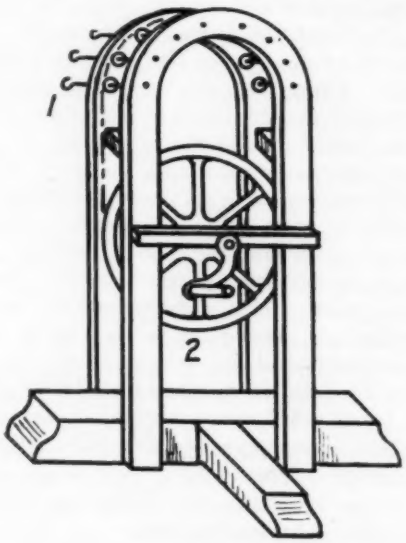


FIG. 3.

Knitting Department

THE KNIT GOODS SITUATION.

During the past month there has been little or nothing doing in the primary knit underwear market, and agents in the New York end have had little to do, except it be to get together details that have been lacking on fall orders placed earlier, or to hasten along the delivery of light weight merchandise. There have been very few jobbers in the market, and it has been said that March of 1911 was the quietest for several years, as far as booking orders with manufacturers was concerned. However, most makers are in a fairly well sold-up condition. There is not as much night work being done in the mills as in former seasons, but the majority have business to last until well into July, and many of them to a much later date.

Travelers for jobbing houses who have been out soliciting orders for fall delivery do not make very rosy reports up to the present time.

There seems to be a tendency on the part of retailers to withhold the placing of advance orders on heavy weights. Stocks in their hands are not heavy, nor are the prices higher than last season; nevertheless, they are not placing orders at all freely, and it begins to look as if the business for fall will drag along until the season opens.

The advance spring business booked by jobbers up to January first did not amount to as much as last year, but since that time some fairly liberal orders for light weights have come to hand, and it now looks that, with favorable weather conditions, the total light weight business will compare very favorably with any season past. The delivery of spring lines from the manufacturer's hands have been made fairly prompt, as a rule, but just at present there is a scarcity of men's balbriggans, and more particularly the lower priced lines. Balbriggans weighing from four to four and a half pounds at $1.80 to $1.85 are in good demand, and any manufacturers who are in a position to make quick delivery can secure plenty of orders. Some manufacturers are offering quick service on five-pound balbriggans at $2.00 to $2.10, but buyers are not showing much inclination to buy this priced goods and are taking chances on later delivery in order to get the lower prices. Half dollar balbriggans are in good demand and some manufacturers who took business at from $3.37½ to $3.50 are considerably behind on their deliveries, the claim being made that there is a scarcity of the class of yarn of which these goods are made.

Business on men's light weight ribbed shirts and drawers has been falling off gradually, and this year the demand for this class of goods has been practically nothing. The Morris Mills have been making a very sightly line of ribbed goods in a variety of colors at $1.90, and also a line of combed yarn goods at $3.00, but the total quantities required of both of these is small as compared with former seasons, and as a consequence of this lessening demand for ribbed goods, this concern has gone into the manufacture of men's balbriggans on quite a large scale.

There has been considerable call for men's combination suits made of balbriggan cloth, and these are being shown by a number of manufacturers. Of course, the bulk of the suit business is placed on ribbed fabrics, and on these, as well as on the flat garments, the call is largely for short sleeves and ankle length. For a season or two there was considerable demand for sleeveless, knee length goods, but for the present season this call seems to have dropped off, and one manufacturer who is a large factor in the men's suit market states that two-thirds of his production is for goods made with short sleeves and ankle length.

The Piqua Hosiery Company are showing a very attractive line of white, Egyptian and peeler men's suits at $7.50, as well as white lisle at $10.00, which has proved to be a good selling number. This concern also makes a line of mercerized goods at $14.00 per dozen in a variety of colors, on which there is a nice business being done.

There has been considerable importing done on men's white lisle combination suits made in France. These are being landed at $15.00 to $20.00 per dozen in fairly good quantities.

In fall lines there is a noteworthy change this season on men's 50 cent goods. During the past few seasons men's ribbed shirts and drawers, to retail at 50 cents, have cut into the sale, to some extent, of the fleece lined goods. This season most of the 50 cent ribbed lines have been cut in weight to eleven pounds, and the country merchants who in many instances only carry one line at this price are passing the eleven pound ribs in order to buy the 12 or 13 pound fleeces at the same price. This has had the effect of giving the fleeced goods manufacturers a good volume of business up to the present time. Duplicate orders for fleeces have come from the jobbers throughout the West in large quantities.

Among the new garments on the market for fall is a child's waist suit made by the Nazareth Waist Company at $3.75. This is a suit made of a bleached knit fabric with drop seat, taped over the shoulders and down the sides, same as the knit waists. It is also supplied with Hunkins pin tube, and with tape buttons around the waist to attach undergarments to. The Nazareth Waist Company have had a light weight garment of this description for some time and, encouraged by the increasing call for a single garment, combining union suit and waist, have introduced the heavy weight and are booking a very satisfactory business.

HOSIERY.

Conditions in the hosiery end have improved considerably since our last writing. Orders for wools, cashmeres and fleece lined goods have come to manufacturers' hands quite freely during the past month, and there are several makers who now claim to be sold up well into October.

The prices on wools and worsted lines remain about the same as last season, although, in most cases, the qualities have been improved. There has not been much change in the total quantity of wools and cashmeres made during the past four or five years, and the few manufacturers who still remain in the business have a fairly staple business each year on this class of goods.

As for spring lines, there has been a change of feeling lately, and as a result of it there has been an increased call for fancy hosiery, and there are many who now look for a season of high colored novelties. Tans are a trifle less in favor than they were a month ago, with a tendency somewhat toward white, due in a measure to the use of white lingerie dresses for spring.

The craze for silk hosiery goes merrily on, and now that very good silk half hose may be had to sell as low as 25 cents, it has had the effect of curtailing the sale of light weight gauzes and lisles.

The Shaw Stocking Company are showing a new line of silk plated half hose in two-toned effect, in six colors, that will get to the retailers for 35 cents, and will probably become popular selling numbers.

SWEATER COATS.

The sweater business is, as a rule, very quiet in the retail department at this time of the year, but usually the latter part of April or first of May there is a revival of the sweater coat business, as the heavier garments are laid aside. Although there is some talk of the passing of this popular knit garment, it is the belief of the writer that the present spring will witness a very satisfactory business on the more staple lines of coat sweaters. It may be that the demand will change to some extent and that coats a little shorter or a little longer will be wanted. Nevertheless, there is sure to be a good staple business on the more conservative styles.

Business on men's coats is undergoing a change in that the demand for the lower priced goods is falling off rapidly, and a cotton coat to sell at 50 cents, 75 cents or $1.00 is no longer wanted to any extent. About the lowest priced numbers that retailers show any interest in are worsted plated goods, to retail at $1.50 to $1.75.

The writer had an opportunity of looking over some numbers of sweater coats made by Hathaway & Reynolds, and saw some very attractive looking garments made with double Byron collars, with large hooks and eyes, at

$13.50 to $15.00 a dozen. These people are also showing a line of coats made with automobile and storm collars, running from $18.00 to $40.00 a dozen, on which it is stated large orders have been placed. This concern sells to the jobbing trade exclusively and are sold up for the year.

KNITTED NECKTIES.

BY LARAMIE.

Knitted neckties still seem to be popular, except that buyers do not want to buy neckties made from wool, low grade silk or artificial silk, to sell for 50 cents, but expect to have them made from better material. As a result manufacturers have to resort to plating in order to get ties heavy enough and still have the silk on the outside. In plated ties cotton is used for the inside. This is quite difficult work, as in making fancy ties the needles are going up and down so much that the cotton is bound to show occasionally on the face. Fig. 1 shows a tie made from cotton and silk on one feed, and all silk on the other feed, with an odd number needle cylinder and an even number wheel cut two and two on one feed, and with a plain cast off wheel on the other feed. On the feed which has both silk and cotton it is necessary to have considerable tension on the silk and none on the cotton. The cotton runs in above the silk, which gives the sinkers a chance to roll the silk over it and bring it out on the face.

When the neck is being made one thread can be thrown out on each feed. Fig. 2 shows a bias stripe necktie made from fiber or wood silk on one feed only, having an even wheel which is all cut except two grooves. Two needles are lifted up at every revolution, and the stripe having considerable tension on it will knit only on these two raised needles. This stripe will run continually through the whole tie, but on the neck one-half the silk which makes up the body of the tie comes out automatically and goes in again when the proper length of the neck has been made. This tie looks good and is made in almost any color, such as black, blue, purple, green, but all are made with a white stripe.

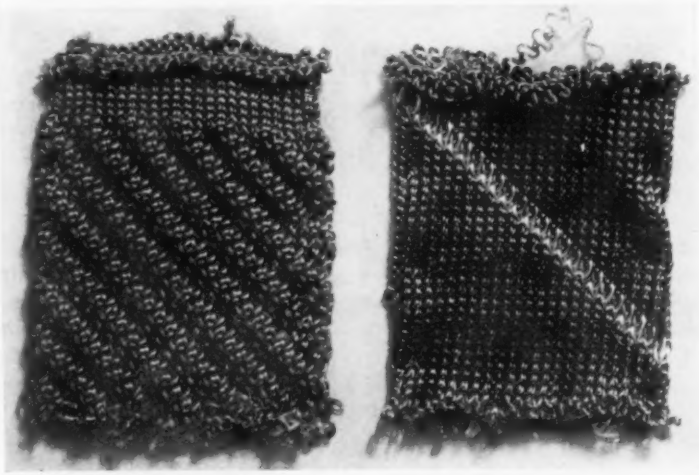


FIG. 1. FIG. 2.

Fig. 3 is another all wool or fiber silk tie which is made on an odd number cylinder, arranging the needles so as to have a long latch needle alternate with a short latch, and using two wheels, one on each feed cut, one and one. The necktie is made by using the same color of silk on both feeds, such as navy blue, green, Alice blue, garnet, etc.

Fig. 4 is a necktie which is popular on account of the stripe. The pattern is made by using an odd number cylinder with all long latch needles, a three and three wheel

on one feed and a plain wheel on the other feed. At every eighth revolution two cams throw the pattern out of action so as to make

FIG. 3.

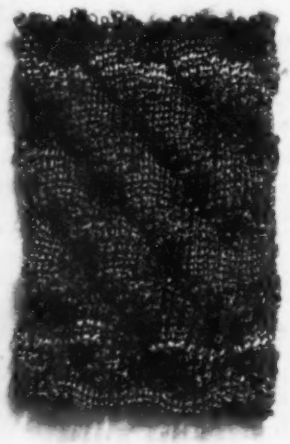


FIG. 4.

four revolutions of plain knitting. After two revolutions of plain knitting have been made on one feed the stripe goes in, which consists of a heavy thread of silk dyed to make say two inches of red, then the same of yellow, green or royal blue, and the red again,

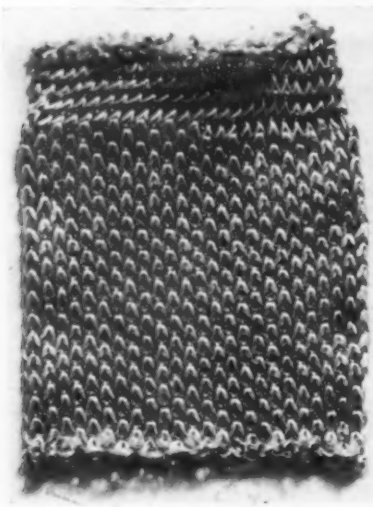


FIG. 5.

FIG. 6.

etc. This will run so that one revolution will have five different colors, and on the other feed a revolution will follow of the plain or solid color. The stripe will run in two revolutions on the plain and two revolutions on the pattern. Then make three revolutions plain and pattern alternately before the stripe goes in again.

There is a good demand for the cheaper

grades of neckties that are made from mercerized cotton and wood silk. Fig. 5 shows a cheap tie which is made from mercerized cotton on one feed and wood silk on the other feed, using an odd number cylinder and all long latch needles, a one and one wheel on one feed and a plain wheel on the other feed. The wood silk should be used on the feed which has the cut wheel so as to show most on top. Fig. 6 is another cheap necktie which is made by using on one feed say one thread of wood silk and one thread of cotton, and on the other feed one thread of cotton. There is more tension put on the silk so as to have it appear on the outside of the necktie. This pattern is also made on an odd number cylinder, using a one and one cut wheel on one feed and a plain wheel on the other feed. This is made in plain colors on each feed, such as black, grey, garnet, etc.

MARKING YARN ON COPS AND CONES.

BY WINWICK.

The following color system for marking counts and grades of yarn on cops and cones has been successfully used for four years by one of the largest and best equipped hosiery mills in the country. It was first tried in one department and later adopted for the entire plant. It is easily memorized and requires but six colors:

WINDER'S GUIDE.

Colors.	Counts.										GRADES.		
											Cotton.	Worsted.	Merino.
Black	1	7	13	19	25	31	37	43	49	55	———	———	50/50
Yellow	2	8	14	20	26	32	38	44	50	56	Egypt	———	80/20
Red	3	9	15	21	27	33	39	45	51	57	Peeler	———	60/40
White	4	10	16	22	28	34	40	46	52	58	Sea Island	———	70/30
Blue	5	11	17	23	29	35	41	47	53	59	Com. Egypt	2nd	———
Green	6	12	18	24	30	36	42	48	54	60	" Peeler	1st	———

The number of any yarn is mentally divided by six; the remainder will indicate the color to be used. The index numbers for the above system are as follows: Black, 1; Yellow, 2; Red, 3; White, 4; Blue, 5. If there is no remainder use green. No. 40 yarn is indicated by White, as 40 divided by 6 leaves a remainder of 4. No. 45 yarn is indicated by Red, as 45 divided by 6 leaves a remainder of 3. Colored cones are used or the tips are dipped for about three-fourths of an inch. It is best to use bright colors which can be readily distinguished. If the common grey cones are used they can be marked by winding in a slip of paper of the proper color. The paper is cut in short strips 2½ inches long by ⅜ inch wide. Wind the slip of paper in between the yarn and cone, allowing one end to protrude ½ inch from the bottom of the cone. This is an excellent way to mark a cone. While the tab may be sometimes torn off the slip can always be found readily and cannot be removed until all the yarn is used from the cone. The best way to mark the yarn is to use color of cones for counts and slips of paper for grades, although both counts and grades may be marked by using two slips of paper on each cone. Thus an 80-20 worsted No. 45 would be marked Red and Yellow whether the yarn was black, white, natural or black and white. Every sixth count bears the same colors, and to prevent confusion the system may easily be changed so that every twelfth count would be marked with the same color. To do this use a pink grade mark on the counts which have 4 as a common factor, as No. 8, No. 12, etc. Then No. 12 peeler would be marked green and pink; No. 18 peeler, green and red; No. 24 peeler, green and pink, etc. Some slight modification would probably meet every need. Why not ask the spinners to adopt standard grade marks by using colored or dipped cops? They could use the grade end of the winder's guide for this purpose. Many mistakes which are not only annoying but often very expensive could thus be avoided.

The imports of cotton goods into the Philippine Islands in 1909 were valued at $7,094,276, of which the United Kingdom contributed $3,443,814; the United States, $793,719; Japan, $738,631, and Spain, $511,404.

MACHINE FOR FINISHING SILK NECKTIES.

This machine, Fig. 1, built by John Eppler's Machine Works, 629 Filbert street, Philadelphia, Pa., is designed especially for the finishing of knit neckties. The tie material is first run over the stretcher at the back of the machine which lays the fabric flat and gives the proper tension for the neckband. The strip is then run over the steam drum in

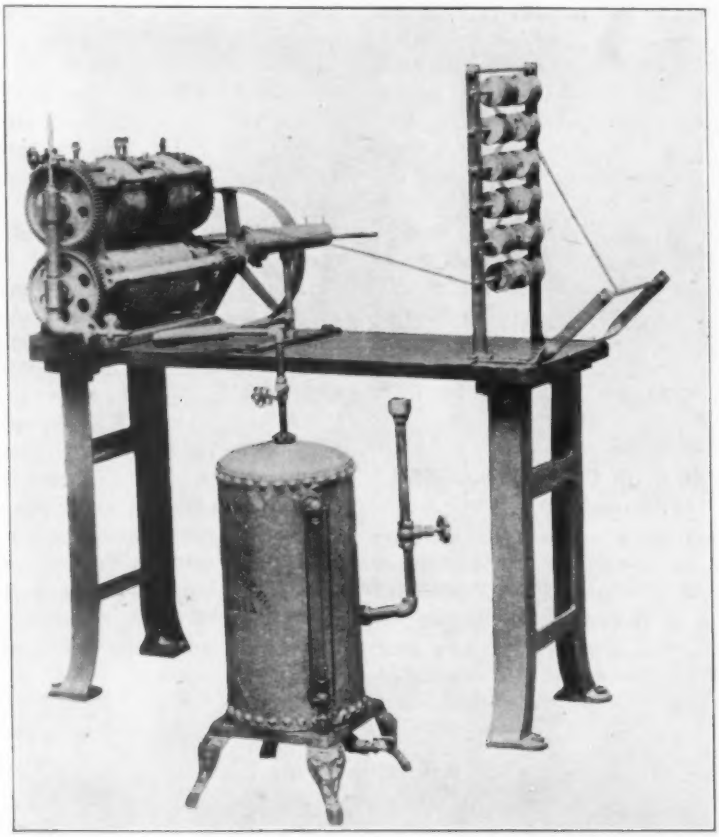


FIG. 1. NECKTIE FINISHING AND EMPOSSING MACHINE

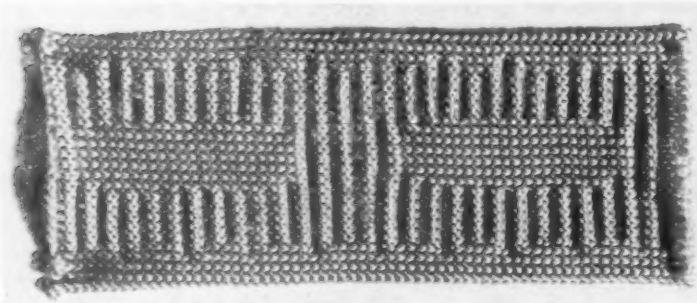


FIG. 2. SAMPLE OF EMBOSSED KNIT NECKTIE.

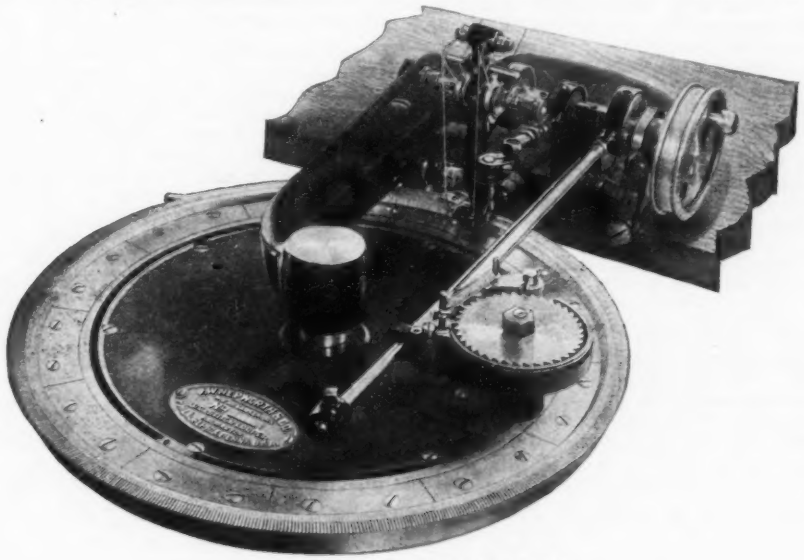
the center of the machine, and next through the rollers. The steam drum is connected with the boiler shown in the illustration. The steaming process gives the tie a fine finish and high lustre and avoids the gloss obtained by ordinary ironing. All hand ironing is dispensed with by the Eppler machine, and as a result the cost of finishing is greatly reduced and the production increased. The machine is started and stopped by a clutch coupling. It is built with three rollers, one at the bottom and two on top, so that two strips of ties can be finished at the same time. The rollers are heated by gas or bunsen burners, and being of large diameter, provide a large heating surface. This machine can also be used for embossing the neckties, and as the parts are interchangeable, different designs can be produced on the same run. A sample of the embossed design is shown at Fig. 2.

In 1850 the spindles numbered in Russia about 2,500,000, while in 1890 they numbered 3,750,000, a gain of but 50 per cent. in 40 years.

In 1909 India produced 4,500,000 bales of cotton, nearly one-half of which was consumed by the Indian mills.

THE HEPWORTH TWO-THREAD LOOPER.

The accompanying illustration shows the new two-thread elastic stitch looping machine, built by John W. Hepworth & Co., N. W. corner Lehigh Ave. and Mascher St., Philadelphia, Pa. This machine is even more simple in operation than the old single-thread looping machine that has been built by the same firm for the last twenty-five years. On the new two-thread looper there are no irregular shaped cams, the motion being obtained entirely by eccentrics, hence there is no irregular cam movement that would cause any adjustment.



THE HEPWORTH TWO-THREAD LOOPER.

One object in designing the two-thread looper was to make a seam that would lie perfectly flat on the points, so that when the work is taken from the points and stretched or when it is boarded there would be no pinholes, as is the case if the loop is pulled in making.

The new Hepworth machine has been tested for nearly a year before it was offered for sale, and the builders are convinced that they now have the simplest two-thread elastic stitch looper. Anyone interested in the new machine can see it in operation, either at the works where it is built or at the annual exhibition of the hosiery and knit goods manufacturers, to be held in Philadelphia in May, 1911.

KNIT.

New Mills.

*New York, Oswego. Bids for the construction of the four-story knitting mill for James H. Shufelt have been secured and it is expected that contracts will be awarded at once. This is an underwear project.

*North Carolina, Sanford. Nearly all the equipment of the new Effie Hosiery Mill has been installed by W. A. Ellington of Chapel Hill, the proprietor. When fully equipped the plant will have 57 knitting machines for making men's and women's seamless hosiery. Mr. Ellington purchased the knitting equipment of the Cross Hill Oil & Hosiery Mill, which formerly did business at Cross Hill, S. C.

*Pennsylvania, Carbondale. It is expected the Carbondale Knitting Mills will begin operations before the first of April. Marcus Frieder is president; E. M. Peck, treasurer, and Nathan Schwartz, superintendent.

Pennsylvania, Philadelphia. A plant for the manufacture of seamless hosiery has been started up at 2856 E. Pacific St., by H. Haynes.

Pennsylvania, Philadelphia. The S. & C. Knitting Co., with Conn & Shalcross as proprietors, are operating two flat knitters, three latch knitters, four sewing machines and two loopers by electric power on sweater coats and underwear for men and children, using 24s to 36s worsted and 20s to 24s cotton yarn. The production of the plant is sold direct.

Pennsylvania, Shoemakersville. R. P. Miller & Co. is the name of the new concern which will equip a portion of the hosiery mill in this town with machinery for the manufacture of ribbed vests, and not Wilson, as recently reported. The firm will consist of R. P. Miller and his father, George P. Miller, who is a director in the Berks Co. Trust Co., of Reading and also a director in the First National Bank of Hamburg. The plant will contain 6 body frames and it is understood will be largely increased as the business grows. It is also said that the main office will be located in Hamburg.

Rhode Island, Providence. A hosiery plant has been established at 287 Thurbers Ave. by J. E. Goss, who is operating under the style of the Narragansett Hosiery Co. on 220-needle men's seamless half hose, mercerized. Yarns are bought.

*Rhode Island, Warren. The officers of the Standard Specialty Mills, the new knit goods concern occupying one floor in one of the mills of the Cutler Mfg. Co., are E. B. Estes, president, and D. J. Burgess, treasurer and superintendent. Both Mr. Estes and Mr. Burgess do buying. Forty knitting machines are operated on sanitary napkins and they bleach and finish the product. Single 20s and 2-40s to 2-80s yarns are used.

Enlargements and Improvements.

Illinois, Champaign. The Textile Mfg. Co., 213 Institute Place, Chicago, is about to start a branch factory at Champaign, on finishing men's and women's underwear.

*Illinois, Rockford. It will be several months before the branch mill of the Rockford Mitten & Hosiery Co., reported last week, will be built. Nothing has been done beyond purchasing a site and reports of plans of the mill are premature.

Indiana, Fort Wayne. J. F. Wing, an architect, has been engaged by the Wayne Knitting Mills, Inc., to enlarge the office facilities. It is stated that the manufacturing space will be enlarged in the near future.

*Michigan, Adrian. The facts in the matter of the consolidation of the Adrian Knitting Co. of this place and the Lewis Knitting Co. of Sauquoit, N. Y., are as follows: The firm of the Lewis Knitting Co., composed of Ladd J. Lewis, Jr., and Wm. J. Harris, at Sauquoit, has been absorbed by the Adrian Knitting Co. of this city, the Adrian Company having increased its capital stock to $200,000. The Lewis Knitting Co. goes out of business, the mill at Sauquoit being continued by the Adrian Knitting Co., with Henry F. Zimmerman as manager. Ladd J. Lewis has been elected president; Ladd J. Lewis, Jr., vice-president and treasurer, and Wm. J. Harris, secretary and general manager. Mr. Lewis, Sr., retires from the active management of the Adrian Mill, but retains his interest, Ladd J. Lewis assuming the financial and outside business of the company while Mr. Harris has the active management of the mill. Mr. Harris has already moved to Adrian. Mr. Lewis, Jr., is living at Sauquoit at present, but will divide his time between the two mills as necessary. During last year the Adrian Knitting Co. purchased a new plant, 300 by 70 ft., 2 stories high, which has been fitted up and will be ready for operation about April 1. The building is up to date in every respect and will make an ideal manufacturing property.

Michigan, Grand Rapids. Additional knitting machines will soon be installed in the plant of the Swiss-American Knitting Works.

*New Hampshire, Laconia. Repairs will be made at once by the Belknap Mills Corp. The loss in the recent fire was $3,500 and not $2,500 as at first reported. J. P. Morin is treasurer, superintendent and buyer.

*New York, Brooklyn. The Utopia Knitting Works, S. Rottenberg, proprietor, have begun the removal of the machinery equipment to the new 5-story mill at East New York and Christopher Aves. The concern will occupy the entire building and hope to have everything in readiness to resume full production within a week or ten days.

New York, Cohoes. It is reported that the Moore Knitting Co. is installing machinery to manufacture men's high grade underwear. Wm. A. Tierney is president and S. A. Moore, treasurer.

New York, Hudson. An addition is to be built to the mills of the Swansdown Knitting Co., 75 by 99 ft., of reinforced concrete and brick, 2 stories high and basement, to be used for picking, carding and spinning departments. This is the addi-

tion which they proposed to build last fall, but deferred construction work till spring. Work will be started just as soon as weather conditions are right.

New York, New York City. The Taconic Knitting Co., against which a petition in bankruptcy was filed several weeks ago, has made a settlement and has resumed operations, manufacturing men's and boys' sweater coats on 40 knitting machines and 10 sewing machines. Theo. Strassner is president, superintendent and buyer, and Mary Strassner is treasurer. They are looking for a responsible selling agent to handle the entire output of the plant which they estimate will amount to $100,000 a year.

*New York, New York City. Rubin Bros. have installed 25 knitting machines and one sewing machine in their knitted necktie department. The plant is located at 149 Wooster St., where they manufactured millinery braids previously.

New York, Utica. The Walnut Knitting Co. has leased an additional floor in the Williams Bldg., and more machinery will be installed.

New York, Valatie. According to reports extensive improvements and additions will shortly be made to the Valatie plant of the Rensselaer & Valatie Mills. The offices have been transferred to Valatie.

*New York, Watertown. It is reported the Shaughnessy Knitting Co. has awarded contracts for the new mill which call for its completion by July 1.

North Carolina, Durham. A 115 by 126-foot addition is planned for No. 1 Mill of the Durham Hosiery Mills to be used for finishing and for office purposes. The New York office of this concern is at 346 Broadway.

Pennsylvania, Harrisburg. W. G. Starry, proprietor of the Wellknit Hosiery Co., will erect a new 3-story brick factory building at a cost of about $20,000 at 14th and Mayflower Sts. His knitting equipment will be increased.

Pennsylvania, Philadelphia. Hughes & Bradley, N. W. Cor. 9th and Market Sts., manufacturers of neckties, are operating 6 circular and 1 flat knitting machine on fine silk neckties and mufflers. It is reported that new machines will be installed within a short time. They sell direct.

Pennsylvania, Philadelphia. The H. L. Munz Co., manufacturers of fine mercerized seamless hosiery on 40 knitters, five loopers and two sewing machines, at 2709 N. Palethorp St., have just placed an order for 25 new machines for the purpose of increasing their equipment and enabling them to keep up with their orders. They are also looking for other and larger quarters which will enable them to further increase.

Pennsylvania, Reading. A new mill will be built at 118-20 North Third St. by S. S. Miller, now located at Walnut and Thorn Sts. The mill will be 3 stories high, 36 by 120 ft., with separate power house to be equipped with a new engine and boiler of 100 h. p. and a dynamo for lighting purposes.

*Tennessee, Knoxville. The Appalachian Mills will begin production in the building of the Knoxville Woolen Mills, recently purchased, about May 1. In connection with this enlargement the capital will be increased to $100,000 and the equipment to 50 knitting machines and 150 sewing machines, as noted. The mill will be equipped with electric drive. Men's cotton ribbed underwear is the sole product of this company.

*Tennessee, Maryville. Thirty new knitting machines are to be installed by the Maryville Hosiery Mills in the addition they began to build last October. Men's, women's and misses' cotton hosiery is manufactured from 14s to 16s combed and carded yarns. The capital stock of this company is $50,000. R. B. Oliver is president; W. H. Oliver, treasurer, and C. S. Grove, superintendent. R. B. Oliver and C. S. Grove attend to the buying.

*Utah, Ephraim. In all probability work will be started during the summer on a new mill for the Sanpete Knitting Works. This is a small concern employing about a dozen hands making cotton and wool underwear, principally for children. C. Hansen is president, and E. Peterson, secretary and treasurer.

*Wisconsin, Beaver Dam. The branch of the Paramount Knitting Co. of Chicago, which is being located in one of the rooms of the cotton mill, is for the purpose of finishing some of the goods made in the plants at Hartford and Waupun, their Wisconsin plants. The company reports that there is no truth in the rumor that this branch is being started owing to a possibility of the branch at Waupun being discontinued.

*Wisconsin, Portage. The new 3-story mill, 40 by 100 ft., to be built for the Portage Hosiery Co., will be used for storage purposes. It will be a reinforced concrete structure and construction work will be started as soon as possible. Plans for the proposed new dye house have not been perfected.

Facts and Gossip.

*Alabama, Anniston. According to reports, a location on West 10th St. has been secured by the Chamber of Commerce for the proposed new knitting mill. It is said the new industry will give employment to 40 or 50 hands and will begin manufacturing during the summer. No definite information is available.

California, San Francisco. Geo. A. Mattern of Gantner & Mattern Co. is in the East for the purpose of buying some new equipment. He will probably order knitting machines for making knitted neckties.

Georgia, Acworth. The Board of Trade is interested in the organization of a company to establish a knitting mill here.

Illinois, Chicago. Officers have been elected by the Friedlander-Brady Knitting Mills, the new corporation which succeeded Friedlander, Brady & Co., as follows: Solomon H. Stix, president; Hugo Brady, vice-president, and Edward D. Friedlander, secretary and treasurer.

Indiana, Richmond. The capital stock of the Richmond Underwear Co. has been increased from $100,000 to $125,000. This is a new company which recently built a plant here and is headed by L. M. Flesh and H. E. Sims of the Atlans Underwear Co., Piqua. O.

Maryland, Baltimore. By order of the Circuit Court of Baltimore the plant of the bankrupt Amherst Knitting Co., 115-17 South Hanover St., will be sold out at public auction on March the 29th. The plant contains 91 knitters, which were operated on women's and children's seamless cotton hosiery.

New Hampshire, Manchester. A hosiery concern which it is said is located at present in Connecticut intends to make a change of location and is considering coming to Manchester if suitable inducements can be offered. Two hundred hands will be required. Secretary Fred T. Dunlap has conferred with the manufacturers and the matter will be taken up by the Board of Trade as there is no factory building available and to provide one will be the work of the Board.

New Jersey, New Brunswick. Reports that the plant of the Norfolk & New Brunswick Hosiery Co. has been sold are denied by the company.

New York, Cohoes. The B. & L. Textile Co. recently installed new knitting and finishing machinery and the plant is at present so rushed with orders that they are compelled to operate the knitting department over time.

New York, Cohoes. The Victor Knitting Mills Co. will be taken over by the creditors' committee and continued for five years or until all the debts of the corporation are paid. If the creditors are not paid in full within five years the committee has the power to sell the assets and other property of this company and of Jacob A. Brooks, the president.

*New York, Kingston. Negotiations are still pending for the sale or lease of the Ashokan Knitting Mill to parties who contemplate putting it in operation. B. D. Otis is acting for the mill.

*New York, Little Falls. According to reports the principal creditors of the Robt. MacKinnon Co. will form a corporation for the purpose of bidding in the property and conducting the business in the future. A reorganization committee has been selected with Attorney Chas. A. Miller of the Utica Savings Bank as chairman.

New York, New York City. The Greater City Sweater Co. has been incorporated with capital stock of $3,000 by Samuel Levin, New Jersey Ave., Annie Klein, 19 Hinsdale St. and Pauline Borovikow, 97 Thatford Ave.

New York. Niagara Falls. The capital stock of the Visor Knitting Co. has been increased from $40,000 to $65,000.

*New York, Schenectady. There has been some talk of locating a silk knitting plant at Scotia, but as yet nothing definite has developed and it is unlikely that an industry will be secured.

New York, Waterford. Rumors that arrangements have been made by the Ford Mfg. Co. to change from steam to electric power are incorrect. There is no probability of any change being made in this direction during this year as the capacity of the plant is taxed to the limit to fill orders and they would not consider any change at present which would in the least reduce the production for even a short time.

*North Carolina, Lumberton. Robert E. Lee, who has been reported interested in a knitting mill project, is president of the Robeson Loan & Realty Co. Mr. Lee and associates are trying to obtain information on knit goods manufacturing which will enable them to decide whether a hosiery plant or an underwear plant is likely to be the more successful, also information as to the cost of establishing a plant.

North Carolina, Mt. Pleasant. A charter has been granted the James Knitting Mill Co. with capital stock of $50,000. A. N. James, C. F. James and M. K. James are the incorporators. The new corporation succeeds the James Knitting Mills, manufacturers of men's and women's seamless hosiery on 24 latch needle knitting machines, which has been conducted by A. N. and C. F. James.

Pennsylvania, Dallastown. The Dallastown Board of Commerce has received a communication from a knitting mill company asking what inducements could be given them to locate here.

*Pennsylvania, Elizabethtown. The plant of the Auto Knitting Mills was completely destroyed by the recent fire and the company reports that they have made no plans for rebuilding or locating at any other place and cannot tell now what will be done.

Pennsylvania, Norristown. The firm name of William T. Tonner has been changed to Tonner & Moyer. The main office and mill is at Norristown and a branch is operated at North Wales. They are manufacturers of women's seamless and ribbed top hosiery.

Pennsylvania, Philadelphia. A charter has been asked for the True Shape Hosiery Co., with Ernest Blood, Hannah Blood and Frederick C. Fuges, as incorporator. The company is now doing business, with Ernest Blood, as proprietor, at Germantown Ave. and Bristol St., where they are manufacturing men's, women's and children's cotton seamless hosiery.

Pennsylvania, Philadelphia. With Max Sarfert, Peter Hernig and Harry Sarfert as incorporators, a charter is being asked for the Sarfert Knitting Mills Co. This concern, it is reported, will operate in the future the plant of the Saxony Hosiery Co., at Allegheny Ave. and Boudinot St., of which Max Sarfert is the proprietor and Harry Sarfert, manager. The mill is operated on men's and women's seamless hosiery, silk and cotton, and at this time is running to full capacity.

Pennsylvania, Philadelphia. The W. Godey Ellis Co., manufacturers of men's, women's and misses' cotton, woolen and worsted seamless hosiery with 300 knitters and a dye and finishing department at 415 Vine St. will discontinue business July 1. The building has already been leased to other parties and the equipment of the plant will be disposed of.

Dyeing, Bleaching, Printing, Etc.

SPECIAL TESTS FOR FABRICS.

LOUIS J. MATOS, Textile Chemist.

The testing of fabrics both chemically and mechanically is a matter of very great importance to the manufacturer, who should be, or have some one in his employ who is, practically conversant with proven, direct methods for determining the value of fabrics, the kind and character of fiber used in their construction, how dyed, and, as far as possible, with what materials, etc.

It is a fact that 90 per cent. of the information necessary to accomplish the above is to be derived only from actual practice. In order that one's judgment should be sound it is necessary that the observations should include many tests upon all classes of fabrics and that conclusions should be reached on the same fabric.

In order to make tests in a satisfactory manner a certain necessary equipment is demanded, including chemical reagents, test glasses and dishes of various kinds, together with a few laboratory appliances, such as drying ovens, thermometers, an accurate balance, together with a microscope which need not be unduly expensive, equipped with eye pieces and objectives adapted to fiber work.

The identification of textile fibers may be conclusively demonstrated only by means of the microscope, and although there are a number of chemical tests for animal and vegetable fibers, etc., they are after all only corroborative, the microscope being the only final test.

The purpose of the present article is not to cover the entire field of fiber and fabric testing, but to give concisely a few special tests applicable to many mills. To the expert chemist many of these tests will appear crude, and without doubt they are, but it must be remembered that there are many mill men who have not been scientifically educated, and for whom the refined methods of chemical testing must be simplified and described in such language as to be readily understood; consequently the trained chemist will not find herein much of interest.

ANIMAL AND VEGETABLE FIBERS.

Without regard to their origin, they may be divided into two groups by the following simple test. Place a few of the fibers in the closed end of a small dry test tube, and in the open end place a small piece of *red* litmus paper. Heat the closed end in the flame of an alcohol lamp or Bunsen burner, noting the fumes given off. If they have the odor of burning horn or hair it indicates that the fibers are of animal origin, which will be confirmed by the red litmus paper changing to blue. On the other hand, if the odor is similar to burning wood or paper the red litmus paper will not change color, while a piece of *blue* litmus paper will be changed to red, indicating that the fibers are of vegetable origin. The difference between the two groups of colors is as follows: Wool, hair and silk, being of animal origin, give off vapors containing ammonia, and as ammonia is alkaline in its properties it changes red litmus paper to blue; thus we are able to place such fibers in the animal group by such a reaction. Vegetable fibers, *i. e.*, cotton, linen, jute, etc., when burned in a test tube give off acid vapors, which change blue litmus paper to red; hence we have a ready means of grouping such fibers.

TO ASCERTAIN IF COTTON IS MIXED WITH WOOL.

Prepare a solution containing 10 per cent. of caustic potash and keep in a bottle with a rubber stopper for use. Place a small quantity of the fibers or yarn to be tested in about one-third ounce of this solution, and boil in a test tube. Wool will completely dissolve, while any cotton or other vegetable fiber present will remain undissolved. As other vegetable fibers resist this action of caustic potash the microscope will quickly show whether the residual fiber is cotton or otherwise.

TO ASCERTAIN IF COTTON IS MIXED WITH SILK.

The quickest and most direct method to determine the presence or absence of cotton

in the presence of silk is to use the microscope, but when this instrument is not at hand recourse must be had to the use of a neutral solution of chloride of zinc, which is prepared by dissolving 10 grammes of fused chloride of zinc in 85 ccs. water, filter, and add 4 grammes of oxide of zinc, after which filter again and keep in a glass-stopper bottle.

Upon immersing a supposed silk and cotton fabric in such a solution silk will dissolve, while the cotton remains unacted upon. Other vegetable fibers will also remain behind, in which case they should be identified by the microscope.

TESTING FOR INDIGO ON DYED FABRICS.

The most common test for this purpose is what is known as the nitric acid test, which has been used for generations and to this day is regarded by many dyers as being infallible. On cloth dyed with indigo only, a drop of nitric acid will show a yellow spot surrounded by a green ring. The defect of this test is that there are many artificial dyestuffs which produce this identical reaction.

DARK BLUES WITH ALIZARINE COLORS ON ALL-WOOL GOODS.

The nitric acid spot test on such fabrics is absolutely useless. The first procedure is to burn a small clipping of the cloth in a small porcelain crucible to a complete ash and fuse this ash with a small quantity of a mixture of equal parts of nitrate of potassium and sodium carbonate. After fusing allow to cool and observe whether the ash is tinged yellow; if so, chromium was used in dyeing the cloth and points to the possible presence of alizarine colors. True alizarine dyestuffs are acted upon by boiling the dyed cloth with sodium carbonate solution.

ANILINE BLUE ON WOOL.

Failure to demonstrate the presence of chromium on wool, and absence of indigo proven, a small clipping of the fabric should be boiled for a few minutes with a solution of tin crystal, dissolved in pure hydrochloric acid. If the color is destroyed this points to the possible presence of azo coloring matters.

LOGWOOD BLUES.

Logwood blues differ from logwood blacks in that they contain little or no chrome, but may contain marked quantities of tin as a mordant. Alum is also used by many dyers for producing logwood blues. To test, burn a small clipping of the cloth to a clear ash, and test for chromium as above described. The presence of alum is detected by dissolving the ash in a drop of muriatic acid, diluting with water, and adding a few drops of ammonia. If the solution becomes turbid or a white precipitate is seen, alum may be suspected. In general, the test for dyes indicated above apply equally to silk as to wool, with the exception of very dark blues on silk which are dyed with logwood on an iron bottom and without the use of chrome. If a little silk is burned to ash and the ash is brown in color iron is present.

To determine the dyestuffs used upon a given fabric is in the majority of cases almost impossible, and in very few cases can it be done to a certainty. It is possible to determine how a fabric has been dyed and to ascertain the character of the colors employed. Such information being quite sufficient to enable the dyer to duplicate the same.

In testing mixed fabrics it is always best to separate the warp from the filling and examine each separately. This applies to some coloring matters capable of dyelng both wool and cotton practically the same shades, but which react differently when each fiber is

THE MICROSCOPE.

Without experience in examining previously identified fibers under the microscope one cannot expect to be successful with it. It is unreasonable to expect that with a piece of goods supposed to contain an admixed fiber, the admixture will show prominently without being specially looked for. One must be familiar with the appearance of the more important fibers when viewed microscopically.

The general testing of dyed fabrics is a matter of great interest and importance, and it is not a subject that can be taken up after reading a description of the processes, but requires considerable practice with fibers and dyes of known origin. A small table set apart for this work, provided with reagents, test glasses, gas, etc., costs but a few dollars, but the value to be derived from it is not to be measured against the original outlay.

FAULTS AND DEFECTS IN CLOTH FINISHING.

BY SERGIUS.

(From the Dyer and Calico Printer.)

(Continued from November.)

Chrome mordants used in dyeing have also a very weakening action upon cloth, particularly when boiled on without the air of any assistant such as tartar, etc., and the ideal treatment for wool cloths, if it could only be carried out, is never to subject them to a higher temperature than can be borne by the hand.

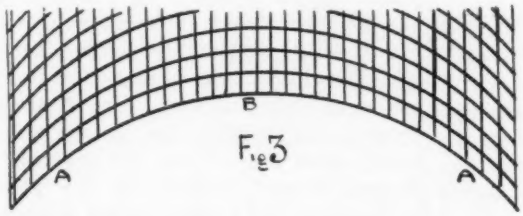


Fig. 3

Fig. 4

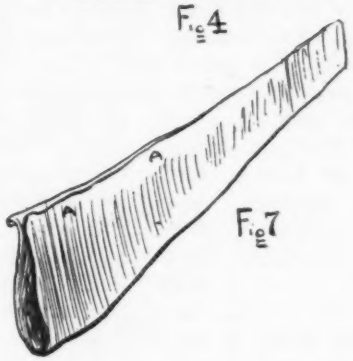


Fig. 7

Fig. 5

Fig. 6

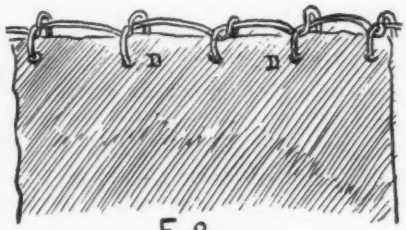


Fig. 8

PIPE BLOWN PLACES.

Figs. 1 and 2 illustrate this fault and its cause, which is that of extremely rapid vibration set up by a current of steam. Fig. 2 represents the general appearance of the fabric, which shrinks up and takes on a crapy corrugated effect like the figure, while Fig. 1, showing a section of an ordinary dye vessel, illustrates how it is caused. As the general custom of heating dye-pans is by means of blowing in live steam, the cloth requires protecting from too close a contact with the steam by using a perforated wood or metal screen, usually wood, so as not to affect the dye. In Fig. 1, A is the perforated steam pipe, the lower limit of which is of copper and extends across the bottom of the vessel. B is the perforated wood screen enclosing the steam pipe, and is pierced by auger holes every two inches.

Under proper working conditions, the vessel is brought to the boil without the fabric coming too close to the entering steam, but should too large a bulk of cloth be handled, it may have a tendency to pile up against the wood screen, B, where there is danger of vibration setting up with the

inrush of the steam. Another cause may be the breaking or enlarging of the holes in the screen, thus allowing steam to enter in a strong current at one spot. The common cause is usually entering too large a bulk of fabric, with the result that it lies too long on the floor of the vessel before the wench distributes it into new folds. Cure for this fault there is none, but prevention is very easy, as it never occurs in a vessel where the circulation of the cloth is equick enough.

DISTORTION OF PATTERN AND ENDS.

This ailment is shown in Fig. 3, and illustrates how the design may be pulled out of shape when entering a tentering or drying cylinder. To guard against this, the end of one piece is sewn to the one following it so as to keep up a uniform tension, but with very thin and elastic cloth this is sometimes difficult to do. Badly acting brakes on a cloth entering a drying machine may cause this fault, the cloth being held back more at the lists than in the center, which causes the latter to get in front. Slack or tight lists may also account for distortion of design, as in this instance the best of brakes cannot equalize the rate of travel. Bowed ends as seen in the figure are very unsightly in a finished cloth; while such figures as squares or diamonds may often be distorted for yards by this cause.

Figs. 5 and 6 illustrate cloth which has slipped in the rolled state, 5 being the roll with the slip at A A and 6 the opened cloth after pulling off. Upright or perpendicular blowing is usually where this fault occurs, and it is also seen in roll boiling in the same position. Slack winding on is the cause, but some fabrics which are very soft and heavy cannot support their own weight when the steam enters, with the result of forming large creases at the bottom of the roll. It is nearly hopeless trying to mend this fault once it appears, and if allowed to cool in this state it can never afterwards be moved. The best plan is to rewind the cloth while hot on to another roll, giving plenty of tension to the lists while rewinding, but if the slip occurs while boiling on the roll it may not be seen until the cloth is lifted out, and this is generally too late to cure.

CURLED LISTS.

These give much trouble to finishers, and the cause originates in the weaving where the lists or selvages are woven tighter than the body of the cloth. On contact with hot water, the lists curl back upon themselves in the manner seen in Fig. 4, which prevents the dye from penetrating and also causes much trouble in tentering. The only remedy for this defect is to bag the cloth as shown in Fig. 7, that is folding list to list until the cloth forms a long tube and stitching it in this position. Fig. 8 shows the style of stitches which are not less than three inches apart and are fastened together in the manner shown. In this state the fabric may be scoured, dyed and washed, without any risk of curling, but, of course, it cannot be raised or tentered in this form. As a rule the lists curl face-side inwards and when so the cloth should be bagged face-side out, so that the curl of one list is opposed to that of the other. When they curl with the back inwards, which is rare, the bagging should then be done the reverse way—that is, with the back to the outside.

A ROTARY DYEING MACHINE.

The dyeing machine shown in the accompanying illustrations and recently been patented in this country, is described by the inventor as follows: The object of the invention is to provide construction and arrangement of parts including a vat, a rotatable carrier provided with a compartment or compartments to receive the goods to be dyed, means for actuating the carrier and means for causing the dye liquor to flow through the vat. The dyeing liquor while flowing continuously through the vat in one direction will be caused by the walls of the compartment of the carrier to flow through the compartment in one direction with respect to the path of the dyeing liquor and in another direction in another position of the compartment with respect to the path of the dyeing liquor.

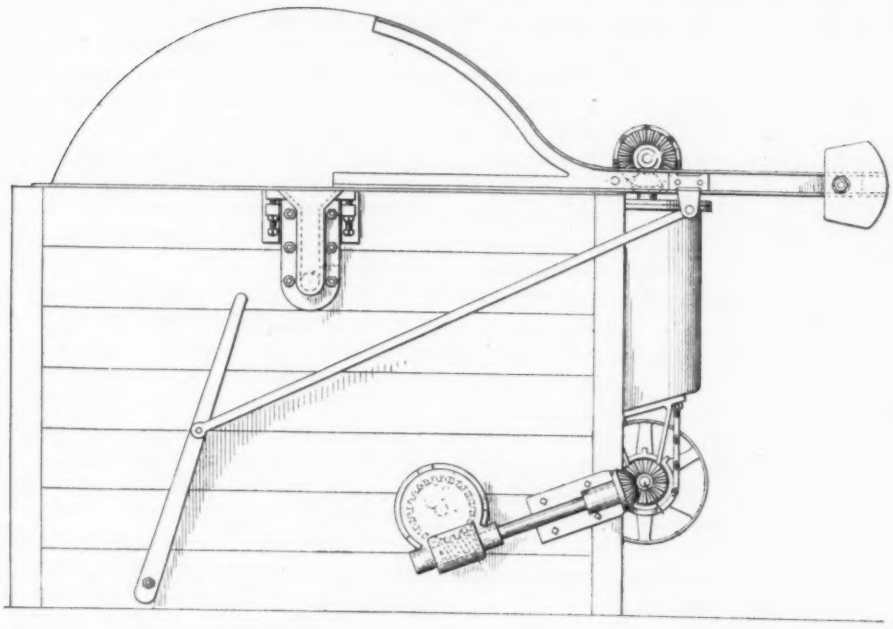


FIG. 1.

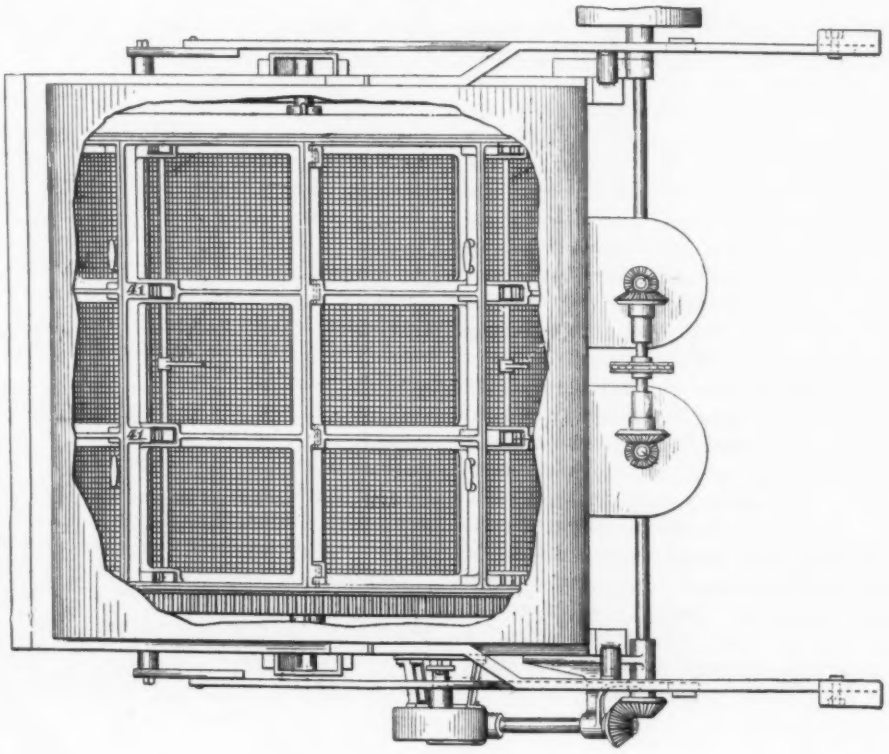


FIG. 2.

Fig. 1 is a side elevation of the machine; Fig. 2, a plan, with the outer casing partly broken away.

The rotation of the carrier tumbles the goods within the compartments, which, together with the dyeing liquor flowing through the compartments in different directions at different times, causes the goods to be subjected thoroughly to the action of the dye liquor. After the goods have thus been subjected to the dye liquor a sufficient length of time, the carrier is again raised from the vat and transferred to a suitable point of discharge, after which the doors of the two lower compartments may be opened to permit the goods to be discharged, and the other doors may then be opened to permit the goods in the two upper compartments to be discharged or removed from the carrier through the two lower compartments.

TESTING THE ACTION OF LIGHT UPON DYED SHADES.

BY KURT GEBHARD.

From the Journal of the Society of Dyers and Colourists.

As the statements that fading takes place only in the presence of air, and that fading of all dyestuffs is due to a general fundamental cause, have been adversely criticized, it appears advisable to discuss the question a little further. Witt does not believe that the fading is in every case due to one and the same general reaction, and bases his criticism upon the fact that the absorption spectra of different dyestuffs are different. This may be looked upon as of little moment, for the absorption of light is a physical, the fading of colors a chemical, phenomenon.

The assumption of a general reaction as the cause of the fading need not be looked upon as out of the way, for owing to the unsaturated character of these bodies, the conditions for autoxidation are must suitable. In some cases it is true, the unsaturated condition is only induced under the action of some strong influence, such as light; but the question whether the reactivity so induced is due to the presence of partial valencies (Thiele) or to intramolecular dissociation (Engler) may for the present be ignored.

That dyed shades do not fade when exposed to light in the absence of oxygen is proved by the experiments of Chevreul, Abney, Russell, Brownlie and Bolis, and I have proved that any slight fading which may occur is due to faulty evacuation of the containing vessel. Dyestuff solutions also remain unaffected when exposed in vacuum, such a susceptible shade of that of a solution of alizarin in alkali remaining quite unaffected.

It is not to be forgotten that, with a few colors, fading due to hydrolysis may occur in the presence of moisture, even in an oxygen free atmosphere. Experiments were made with dyestuffs dissolved in well-boiled water, the solutions being protected by a layer of paraffin; but using thoroughly evacuated tubes there was no fading noticeable upon exposure in any single case. The same negative result was obtained when shades dyed upon cotton were exposed in vacuum tubes containing a little water. Exposure in an indifferent atmosphere of hydrogen or nitrogen has no effect, and apparently there is very little when exposure takes place in an atmosphere of dry oxygen. In the presence of oxygen and moisture, however, the effect is most pronounced.

Seeing that dyed shades are permanent in a vacuum, one would like to know what is the "work" which is done by the light rays. Besides the already mentioned changes which occur in a system subjected to the influence of light, the effect may be to set up an intramolecular vibration in the dyestuff particles, resulting (by the loosening of certain valencies) in a condition of greater reactivity whereby the combination with oxygen is promoted.

As mentioned in the previous communication, it may be assumed that the primary process is a reaction between oxygen and the ions of water, resulting in the production of perhydroxyl ions, and, secondarily, the union of the perhydroxyl ions with the dyestuff.

Besides the indirect evidence in favor of the probability of the reaction, it has been possible to show experimentally that it is the perhydroxyl ions which are responsible for the fading of colors. Experiments, based

upon the change in the concentration of ions in solution upon electrolysis, have shown that where the concentration of perhydroxyl ions is highest, the degree of fading taking place in the solution is greatest. The formation of "dyestuff peroxides," both in solution and on the fiber, has been proved in the case of many differently constituted dyestuffs.

Since this peroxide formation may serve as a basis upon which a standard test may be grounded, it may be useful to discuss more fully the formation and behavior of these peroxides, as also the question of a standard method for determining the fastness of dyed shades.

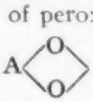
Knecht pointed out some time since that in general the term "fastness to light" is incorrectly used to indicate "the fastness to light and air;" for simplicity's sake the expression is, however, retained. The views as to what is understood by fastness to light appear to be very divided, as is evident from the behavior of many dyeings looked upon in general as fast to light. Some agreement upon the point is desirable, not only from its practical but also from its scientific interest, and it is eminently desirable that some simple, generally accepted method of testing should be adopted. Almost every color works has its own method, and classification, and the statements published with respect to one and the same color, but from different sources, do not always entirely agree. As it has been in other industries, so it will be here, that standard, well recognized methods of testing will be introduced. Imperative considerations of any method must be that the conditions of testing can be easily reproduced and controlled, and that the judgment upon the results of the tests shall be as little subjective as possible. It may be that the simplest way of attaining uniformity in the determination of the fastness of colors would be that all dyestuffs placed upon the market should be tested and classified at some recognized testing house.

The chief factors which must be taken into consideration in testing the fastness of dyed shades to light are the atmosphere, the source of light, and the nature of the dyed fiber. The conditions holding in practice should be adhered to as closely as possible, but to shorten the time of exposure required, the most suitable conditions to produce fading should be chosen.

In the atmosphere surrounding us it is the oxygen which interests us mainly, as this is the constituent which is responsible for the fading; the moisture, acid and alkali contents only influence the rate at which fading proceeds.

In pure, dry air, dissociated oxygen molecules associate themselves with the dyestuff, forming peroxides which possess relatively good stability. The reactions, indicating the presence of peroxides, may be obtained before any change in the shade of the dyeing is noticeable, and it has been proved that these reactions are not due to the presence of hydrogen peroxide. The dyestuff character of the compound remains, but the shade is sometimes slightly altered.

The conditions are very different when moisture is present, for the greater the amount of perhydroxide formation, the more rapid will be the destruction of the color. This may be demonstrated by a simple experiment. Expose a dyed shade in a dry atmosphere, protecting the parts marked 1 and 2 by means of black paper. Little change will be noticed in 3 and 4, but upon covering 1 and 3, and exposing in a moist atmosphere until 2 has reached the same shade as 3, it will be found that 4 has faded considerably, owing to the destruction of the dyestuff peroxide formed during the first exposure.

A similar result is obtained when patterns are exposed, one in a dry atmosphere only and another in a moist one; dyestuff peroxides are formed in each case, but their permanence and power of reaction is very different. Since with many dyestuffs fading proceeds fairly regularly in a moist atmosphere, whereas in a dry one wide variations in the rate may occur, it is probable that we have to deal with two differently constituted classes of peroxides—one a relatively stable form,  and a labile, highly reactive

one of the peroxide hydrate type, $A\langle^{OOH}_{OH}$

Whereas the dyestuff peroxides are mainly formed during exposure in a dry atmosphere, the peroxide hydrates result from the addition of perhydroxyl ions, produced by the union of oxygen atoms with the ions of water. The peroxide hydrates are highly reactive, and the active oxygen which they contain may act upon unchanged molecules of the dyestuff or upon other members of the system (for instance, the fiber), or they may decompose with the production of acids or phenols. The existence of acid groups, produced in some such manner, has often been noticed.

Peroxides may also result from the exposure in a moist atmosphere, when, from the constitution of the dyestuff or its combination with other substances, the peroxide hydrate passes into a more stable form $A\langle^{O}_{O}|$ by elimination of the elements of water. Dyestuffs with which this occurs are said to be fast to light, for with them there is no apparent change during a long period of exposure.

Fugitive colors are therefore those with which the tendency to peroxide hydrate formation is greatest, while with fast colors the peroxide hydrates tend to split off water and pass into the more stable peroxide form. That even in this case the formation of peroxide hydrates is the first result of exposure, may reasonably be assumed from the observation that in the presence of moisture the rate of peroxide formation is increased. The moisture contents of the atmosphere must therefore be one of the chief considerations in any standard test.

(To be continued.)

According to Census returns, the growth of the silk manufacturing of the United States has been as follows: 1900, $107,250,000; 1905, $133,250,000, while it is estimated that the returns of production for 1910 will run considerably over $150,000,000. The number of silk establishments has increased from 67 in 1850 to 624 in 1905.

Dye Recipes

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 49.

Violet on Worsted Yarn.

Wool Violet R L on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Wool Violet R L.
(Kalle & Co., 530 Canal St., N. Y.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Dye at a boil for one hour. Wool Violet R L possesses good fastness to light, and is a level dyeing color.

Recipe No. 50.

Bordeaux Red on Cotton Yarn.

Triazol Bordeaux B on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Triazol Bordeaux B.
(Geisenheimer & Co., 189 Front St., N. Y.)
30 lbs. Glauber's Salt.
1 lb. Soda Ash.

Enter at 160° F., and dye at a boil for one hour. Triazol Bordeaux B possesses the ordinary properties characteristic of the direct cotton colors.

Recipe No. 51.

Orange on Cotton Yarn.

Direct Orange N on 100 lbs. cotton yarn. Prepare the dye bath with

¼ lb. Direct Orange N.
(E. M. Thayer & Co., 411 Atlantic Ave., Boston, Mass.)
10 lbs. Common Salt.

Enter at 180° F., and dye at a boil for one hour. Direct Orange N possesses the usual properties of the direct cotton colors, and is particularly useful for self-shades. Its coloring power will be found to be comparatively high.

Recipe No. 52.

Violet on Cotton Yarn.

Chlorazol Violet B N on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Chlorazol Violet B N.
(Read Holliday & Sons, 11 Gold St., N. Y.)
10 lbs. Glauber's Salt.
1 lb. Soda Ash.

Dye in the usual manner.

Chlorazol Violet B N possesses good fastness to light, washing, acid, alkali, or calendering.

Recipe No. 53.

Yellow on Worsted Piece Goods.

Amazo Fast Yellow 6 G Pat. on 100 lbs. worsted piece goods. Prepare the dye bath with

1 lb. Amazo Fast Yellow 6 G Pat.
(American Dyewood Co., 84 William St., New York.)
3 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter lukewarm, raise slowly to a boil and boil one hour.

Amazo Fast Yellow 6 G Pat. is distinguished by eminent leveling properties and exceptional fastness to light. It is especially to be recommended for the coloring of all forms of wool where results of extra fastness to light are required.

Recipe No. 54.

Green on Cotton Yarn.

Diamine Nitrazol Green S on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Diamine Nitrazol Green S.
(Cassella Color Co., 182 Front St., N. Y.)
20 lbs. Common Salt.
1 lb. Soda Ash.

Enter at 180° F., and dye at a boil for one hour. Then rinse and couple with

Diazotised Paranitraniline or Nitrazol C. Prepare the coupling bath with

2 lbs. Paranitraniline.
4½ lbs. Hydrochloric Acid, 32° Tw.
4 gals. Hot Water.

Cool and add

1½ lbs. Sodium Nitrite,
8½ lbs. Cold Water,

with constant stirring, and when the solution clears, add

20 gals. water.

Just before using add

½ lb. Soda Ash.
¼ lb. Sodium Acetate.

Work the dyed yarn in this bath for 20 minutes. then wash thoroughly.

Diamine Nitrazol Green S. possesses good fastness to washing and light.

Recipe No. 55.

Blue on Cotton Yarn.

Diaminogene Blue 2 R N Pat. on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Diaminogene Blue 2 R N Pat.
(Cassella Color Co., 182 Front St., N. Y.)
20 lbs. Common Salt.
½ lb. Soda Ash.

Enter at 180° F., and dye at a boil for one hour. Rinse and diazotise in a bath made up with

2½ lbs. Sodium Nitrite.
7½ lbs. Hydrochloric Acid, 32° Tw.

Rinse and develop in a bath made up with

1 lb. Beta Naphthol

dissolved in

1 lb. Caustic Soda Solution, 76° Tw.,

and made up with the necessary amount of water.

Diaminogene Blue 2 R N Pat. dyed in this manner possesses very good fastness to washing.

Recipe No. 56.

Brown on Worsted Yarn.

Mercerol Brown 3 R on 100 lbs. worsted yarn. Prepare the dye bath with

½ lb. Mercerol Brown 3 R.
(Read Holliday & Sons, 11 Gold St., N. Y.)

which has previously been dissovled in luke warm water.

10 lbs. Glauber's Salt.
3 lbs. Acetic Acid.

Enter the goods and raise the bath to a boil, boiling for 1/2 hour gently. Shut off the steam and add 1/2 lb. sulphuric acid, largely diluted with water, and continue dyeing for another half hour. Mercerol Brown 3 R possesses good fastness to light and washing.

Recipe No. 57.

Blue on Worsted Yarn.

Acid Blue B on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Acid Blue B.
(Innis, Speiden & Co., 46 Cliff St., N. Y.)
10 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.

Enter at 160° F., bring to a boil, and dye at a boil for one hour, or until the dye bath is exhausted.

Acid Blue B will be found to possess great brilliancy and is valuable for the ordinary requirements of an acid dyestuff.

Recipe No. 58.

Red on Cotton Yarn.

Drazaline Red N on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Drazaline Red N.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
30 lbs. Common Salt.
1 lb. Soda Ash.

Enter at 180° F., raise slowly to a boil and dye at a boil for one hour.

Drazaline Red N, for a direct cotton color, possesses very good fastness to light. It is extremely fast to acids, even resisting dilute mineral acids. Its principal uses will be found for the dyeing of imitation Turkey Reds for table covers, ticking stripes, tapestries, and all other places where a good fastness to acids is essential.

Recipe No. 59.

Black on Worsted Yarn.

Wool Black 6 B on 100 lbs. worsted yarn. Prepare the dye bath with

6 lbs. Wool Black 6 B.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
4 lbs. Acetic Acid.
20 lbs. Glauber's Salt

Enter at 140° F., raise slowly to a boil and dye at a boil for 3/4 of an hour. Then add

2 lbs. Sulphuric Acid

and continue the boiling for 1/2 hour to exhaust the dye bath.

Wool Black 6 B gives bloomy blue black shades, and will be found equally useful in yarn, piece goods, or raw stock dyeing.

Recipe No. 60.

Yellow on Cotton and Wool Union Material.

Union Yellow 2010 on 100 lbs. cotton and worsted union cloth. Prepare the dye bath with

2 lbs. Union Yellow 2010.
(Innis, Speiden & Co., 46 Cliff St., N. Y.)
25 lbs. Common Salt.

Enter the material cold, work for ten minutes, then raise the bath to a boil in about ten minutes, and boil for 20 minutes or until the full shade is obtained. Turn off the steam and allow to run for 20 minutes longer.

Union Yellow 2010 possesses good fastness to light, acids, and fulling.

Recipe No. 61.

Red on Worsted Piece Goods.

Amazo Brilliant Red 2 B on 100 lbs. worsted piece goods. Prepare the dye bath with

2 lbs. Amazo Brilliant Red 2 B.
(American Dyewood Co., 84 William St., N. Y.)
3 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter lukewarm, raise slowly to a boil and boil one hour. Then rinse.

Amazo Brilliant Red 2 B is a rich red of excellent fastness to light and of eminent leveling properties. It will be found valuable in the coloring of fashionable shades on all forms of wool.

Recipe No. 62.

Violet on Cotton Yarn.

Triazol Violet R R on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Triazol Violet R R.
(Geisenheimer & Co., 189 Front St., N. Y.)
25 lbs. Common Salt.
1 lb. Soda Ash.

Enter at 180° F., and dye at a boil for one hour.

Triazol Violet R R possesses good fastness to light and washing.

Recipe No. 63.

Blue on Cotton Yarn.

Diamine Fast Brilliant Blue R Pat. on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Diamine Fast Brilliant Blue R Pat.
(Cassella Color Co., 182 Front St., N. Y.)
20 lbs. Common Salt.
2 lbs. Soda Ash.

Enter the material at 180° F., and dye at a boil for one hour.

Diamine Fast Brilliant Blue R Pat. is distinguished by the bright shade which it produces, and its excellent fastness to light.

Recipe No. 64.

Green on Worsted Yarn.

Anthra Cyanine Green B L on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Anthra Cyanine Green B L.
(Farbenfabriken of Elberfeld Co., 66 Lafayette St., N. Y.)
15 lbs. Glauber's Salt.
5 lbs. Sulphuric Acid.

Enter at 140° F., and dye at a boil for one hour.

Anthra Cyanine Green B L is easily soluble and penetrates well, possesses very good fastness to light, and good fastness to alkalies, stoving and steaming. It is valuable for the dyeing of ladies' dress material.

New Machinery and Processes

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

We invite machine builders and others to send us such information for this department.

Air Moistening System. Thomas & Smith, Inc., 116 North Carpenter St., Chicago, Ill. A system of moistening, purifying and cooling air, which has been in use for a number of years in different parts of the country and is now being introduced into textile mills.

Transfer Iron for Marking Textiles. H. A. Meyercord, Bulletin Bldg., Philadelphia, Pa. A transfer iron for applying transfer stamps to hosiery and other textile goods. It is described and illustrated in this issue.

Ply Fabrics. Siegfried Herzberg, Charlottenburg, Germany. A process for rendering soft and pliable ply fabrics in which the single cloths are fastened together by rubber cement.

Oiling Wool. J. J. Marx, Lambrecht, Germany. An automatic device for oiling wool in the picking room.

Flyer. Charles Millecam, Gand, Belgium. An improved flyer with special means provided for fastening it securely to the spindle and removing it when required.

Double Doffer Woolen Card. J. Hetherington & Sons, Manchester, Eng. A card having an extra fancy and doffer under the regular fancy and doffer, the object being to clear the cylinder better, increase the production of the card and improve the quality of the work.

Dyeing Jigger. Gustav Linkmeyer, Herford, Germany. An improved jigger especially adapted for the dyeing of indigo colors.

Warp Dressing Frame. George Nutter & Son, Elm Street Iron Works, Burnley, England. An improved frame for dressing colored and sized warps from the ball.

Preventing Picker Stick Breakage. George Schwabe, Bielitz, Austria. A device for preventing the breakage of picker sticks.

Warp Stop Motion. P. A. Heintze, Marklissa, Germany. An electric warp stop motion which it is claimed embodies a number of important improvements.

Mercerizing Knit Goods. Robert Mueller, Limbach, Saxony, Germany. A method of mercerizing fashioned knit goods.

Slasher. Gebrueder Lange, Lodz, Russia. An improved slasher which has been installed in Russian mills with satisfactory results, the sizing being uniform and a large production obtained. It is claimed that the yarn is placed on the beam in better shape for weaving than has heretofore been possible.

Warp Stop Motion. Vogtlaendischen Maschinenfabrik, Plauen, Germany. An improved warp stop motion which has been introduced into a number of Saxon mills with gratifying results.

Fringe Twister. Ferdinand Klages, Barmen, Germany. A machine for twisting fringe on braid, which is stated to be a very important development in the manufacture of passementerie.

Electric Singeing Machine. Percy Sands, 21 Cannon St., Manchester, England. An electric singeing machine, metal bars being substituted for wires. This machine was invented on the Continent, where it has been installed in a number of mills and is now being introduced into England.

Dust Remover. H. Smethurst, Oldham, England. A portable dust remover for card rooms dispensing entirely with overhead piping or conduits of any kind.

AN IMPROVED DRAWING FRAME.

This drawing frame, built by the Woonsocket Machine and Press Co., is designed so as to provide a strong rigid frame without undue weight. At the same time it is simple in construction, all its parts are easily accessible and designed to meet thoroughly the exacting conditions in the cotton mill which a drawing frame must meet. Particular attention is called to the fact that this drawing frame is so constructed that any part can be removed from the machine without disturbing adjacent parts or adjustments. Also, the middle sampson is so designed that it does not interfere with the cans at the back in any way. The back, front and full can stop motions are positive and simple in their action.

Framing and construction: The framing of the machine is of unique construction, being made entirely of steel, patents of which are pending, which makes it extremely strong and rigid without the aid of cross bars or diagonals. Can tables are set on top of floor.

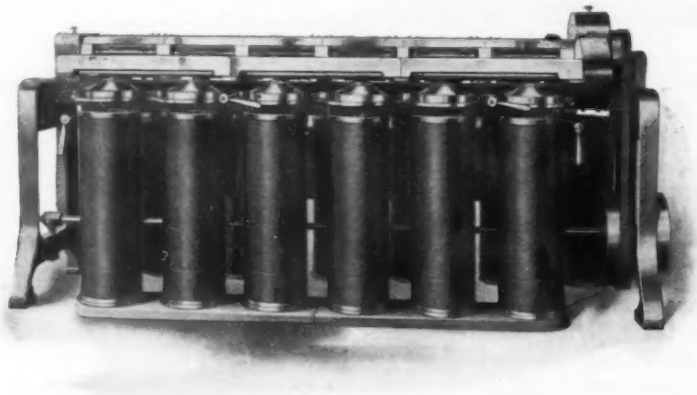


FIG. 1. THE WOONSOCKET DRAWING FRAME.

Bottom fluted rolls are made in one length and are irregularly fluted to prevent cutting of top rolls. The usual diameters are 1¼ inches or 1⅜ inches front, 1⅛ inches second, third and back lines.

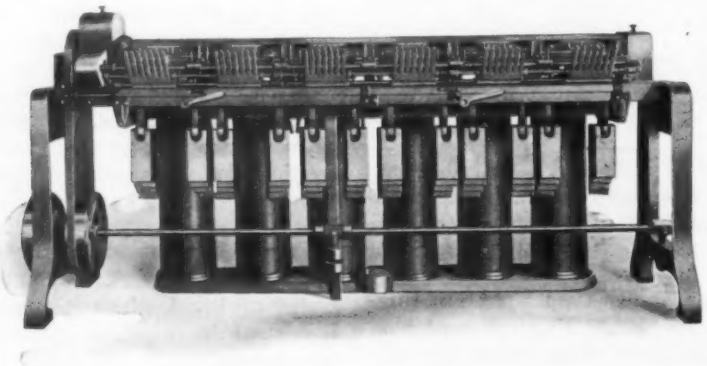


FIG. 2. THE WOONSOCKET DRAWING FRAME.

The top rolls are usually one inch in diameter on the iron. The four lines have loose ends. They furnish either the ball bearing, leather-covered, or metallic rolls, as desired. The calender rolls are made of steel, turned, ground, polished, and are so arranged that each section can be taken out individually

without disturbing any other section. The roller stands have composition blocks in them for roller bearings and are made with separate adjustable bearings so constructed that the top and bottom rolls move together when setting for different lengths of staple. All draft and roller gears are cut. Draft changes are very easily made, it being necessary to change only one gear to alter the draft. The gearing is well protected with polished covers. The coilers are made for cans, 36 inches long, 10 or 12 inches diameter, as required. The trumpets are made separate from the calender roll plates and can be taken out and replaced when worn. The back sliver guides are so made as to separate the slivers and stop kinks from entering the rolls. Uneven work is thus prevented.

A close adjustment of tension can be made for either ordinary or metallic rolls by means of fine pitch gearing for the take-up of the sliver between the front rolls and calender rolls, thus reducing the breakage, sagging and stretching of the sliver and preventing stoppages and waste. Both the top and bottom rolls have clearers. Calender roll clearers and covers can be taken out for cleaning and the like, without breaking the sliver between calender rolls. The weight relieving motion is applied to all frames for taking the pressure off the rolls when the frames are stopped. All rolls are weighted separately. The usual weights are 20 lbs. front line; 18 lbs. second line; 16 lbs. third line, and 14 lbs. back line. The traverse motion is positive. Each part can be taken out without disturbing the adjustment of any other part and is applied to all frames with leather-covered top rolls. The driving pulley on the bottom shaft is usually 16 inches diameter, three-inch face, and can be placed at either end of the frame. The usual speed of this shaft is 250 r.p.m., which gives a calculated speed of 363 r.p.m. of front roll. Ratio of front roll to bottom shaft is 1.45.

The quantity of cotton imported into France in 1909 amounted to 1,404,258 bales, of which 213,198 bales were reexported, thus making the amount retained for consumption 1,191,060 bales.

A TRANSFER IRON FOR APPLYING TRANSFER STAMPS IN MARKING TEXTILES.

The transfer iron shown in the accompanying illustration is specially designed and manufactured by H. A. Meyercord, 603 Bulletin Bldg., Philadelphia, Pa., for applying transfer stamps to hosiery and other textile goods. The advantage in the use of this iron lies in the fact that it can be heated by placing it on any heater, electric plate, gas or oil stove. It is light for the operatives to handle and having no electric cord or gas hose does not interfere with the work. Each operative

A TRANSFER IRON FOR APPLYING TRANSFER STAMPS.

should have two irons, one being in use and the other on the heater. Where electricity is used the irons are set on the electric plate, which holds enough irons to accommodate several operatives. The electricity is required turned on for only a short time, as the

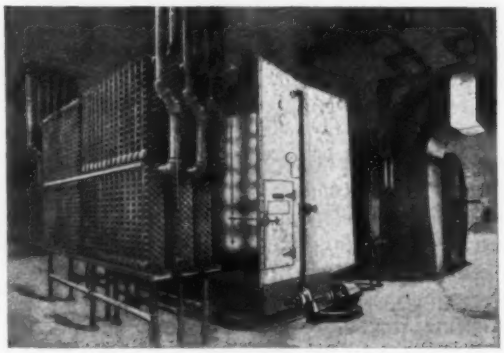
irons remain hot enough to put the transfers on several dozen hose at a time before needing reheating. Mr. Meyercord carries a stock of these irons on hand and is, therefore, ready to fill orders promptly.

THE ACME SYSTEM OF PURIFYING, COOLING AND MOISTENING AIR.

This system of moistening and purifying air was first introduced about fourteen years ago and is now installed in many of the leading establishments throughout the country. It is owned by Thomas & Smith, Inc., 116 North Carpenter St., Chicago, Ill. Judging from successful results obtained in public buildings, manufacturing establishments and hotels it should be well suited for textile mills.

By means of the suction created by the blower or fan, the air is drawn through the air intake into the spray chamber. It is in this chamber that the air comes in direct contact with curtains, or sheets of water that are thrown transversely across the chamber. This water is distributed evenly and offers a uniform resistance to the air throughout the entire cross section of the chamber. The air upon striking the sheets of water becomes thoroughly saturated and washed. The heavier particles of dirt and foreign matter are precipitated with the water into the tank. The combination of air and moisture, which finally issues through the mechanical mixture of the finely divided spray and air, is carried on to the eliminator chamber, where the work of separation is done. The illustration shows the Acme air washer set in place and ready for the sheet metal connections.

The eliminators used in the Acme system are generally of the vertical type. The patent covers a number of other forms and occasionally some special reason arises for using one of these variations. However, the vertical type is self-cleaning. The silt and heavy matter that has not been precipitated by the action of the spray is thrown violently against the first row of baffle plates, together with a large volume of spray water. This mixture washes down the plates to the drip board or base plate, which has a sharp incline toward the settling tank. All the matter is finally deposited in this tank by reason of the flushing continually going on. This rapid and constant washing of the plates makes the Acme system a remarkably sanitary and cleanly apparatus. This is especially true, as this method offers no horizontal ledges or surfaces, having corners to catch and retain dirt.



THE ACME AIR WASHER SET IN PLACE AND READY FOR THE SHEET METAL CONNECTIONS.

Every part of the eliminator is so constructed that the flood of water rushing down and over the plates keeps up a constant scrubbing action. The entire eliminator or separator is less than three feet in length and is so effective in arresting every particle of suspended moisture or water that it is possible to direct a stream of 30 to 40 pounds pressure against them and not a particle of water will pass through the plates which make up the eliminator.

The primary object sought by the inventor of the Acme air washer and purifier was the removal of dirt from the air introduced into buildings by blowers or fans used for either heating or ventilating. The results in this direction proved at once that the problem was more than solved, as the purification of the air to a very great extent went beyond the mere extraction of dirt and water. The air after passing through the washing apparatus was not only clean and dry, but many other impurities in the form of vile gases were eliminated. A healthy degree of humidity was maintained irrespective of any outside hygrometric changes. The apparatus regulates itself to the varying conditions.

The Acme system has also simplified to a very great extent the vexatious question of how to cool the air in summer. The reduction of heat is effected in two ways: Contact with the cold spray water; evaporation of the water.

The average cooling effect maintained is approximately 12°, or, in other words, within 4° of the temperature of the cooling water used. Where an apparatus is required for its cooling effect primarily, provisions are made in the design so as to allow the air to be in contact with the cooling medium a greater length of time. The elimination of disease germs is another one of the results that can be secured from using this apparatus. This is of great importance where public buildings are located in districts where the air is polluted with vile odors and germs.

The question of humidity will commend itself especially during the winter season. In the ordinary heating installations the relative humidity is so low that the membranes and tissues of the body are seriously affected. In other words, the moisture is absorbed or evaporated from these tissues on account of the very low percentage of moisture in the air. By means of the Acme system the proper amount of moisture is supplied to the atmosphere, with a beneficial result to these membranes.

For conditions under which a definite humidity control is to be maintained the inventors are prepared to install special devices for automatic regulation, to be used in conjunction with the apparatus. The principles of operation are baser on the fact that the temperature of air determines its moisture-carrying capacity. By means of regulation through a hygrostat located in relation to its specific duty, the proper amount of moisture is added to the air when passing through the purifying apparatus. The hygrostat automatically operates the tempering medium in regulating the absolute humidity and resulting in a constant percentage of relative humidity in the discharged air. By the use of their form of tempering medium they can dispense with the steam coil, or pre-heater, placed in front of the spray chamber. This item itself is of importance when the reduction of floor space is considered. The humidity controlling devices are made an integral part of the purifier and do not require additional space and complications. Simplicity and economy of operation are other prime features in the Acme design.

A MACHINE FOR LACING BELTS.

The use of raw hide for belt lacing, while an old and quite common method, has so many disadvantages that every one connected with the plant, from the manager down to the master mechanic, is always looking for some new and better method. In the first place, the raw hide lace costs from 10 to 12 cents for the material used to lace a medium size belt and often is the cause of a time loss of one quarter to three quarters of an hour. Another bad feature about the use of lace leather is the fact that when running in a damp or steamy atmosphere it will frequently get slimy and pull out of the belt. Still another objection to lace leather may be found in the thick and thin places which frequently occur in the hide and unless precautions are taken when stripping the lace up, will cause weak spots which will break much sooner than other sections of the lace. These troubles result in a formidable expense account, including the time loss of the men operating the machine and the production loss from the machine itself.

The Jackson belt lacing machine, manufactured by the Birdsboro Steel Foundry and Machine Co., Birdsboro, Pa., is designed to remedy these difficulties by using wire in place of lace leather. The manufacturers state that the machine makes the cost of material to lace a five-inch belt about one cent. One man can lace such a belt in about three minutes. When this small cost of operation and material is compared with the older method of using raw hide lacing it is at once evident that there is enough money involved to warrant the serious consideration of every plant manager and master mechanic in the country.

Occasionally one of the larger belts has to be laced during operating hours, which perhaps connects the main shaft with one or more counter shafts, thus causing several machines and workmen to be idle during the

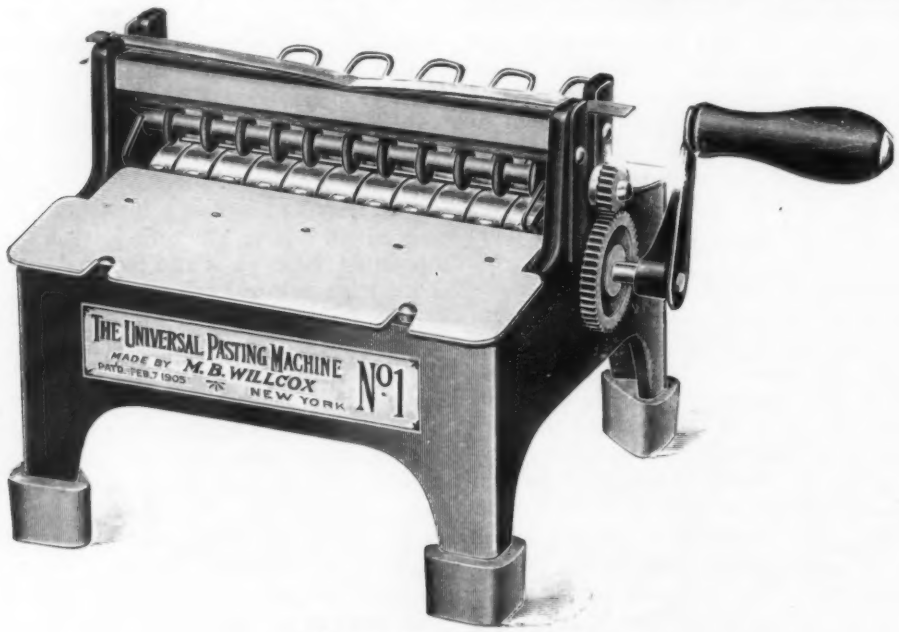
time the lacing operation is going on. This labor and production cost, when several machines are involved, runs into money very rapidly. In dye house work serious damage may result from stopping a dyeing machine to lace a belt.

Few superintendents and master mechanics know the exact cost of their belt repairs. In the large plants these repairs are so frequent that one or more men are usually employed in repairing belts, and beyond their time cost no record is made of the other losses except the use of the material involved. Another point is that the holes punched in the ends of the belt to accommodate the lace leather in time become rotted by reason of water or other liquid coming in contact with the belt, and as a result the belt breaks along the line of the holes several inches back from the end of the belt. This necessitates inserting a new piece of belting, making two laced joints in place of one.

With the Jackson joint, as will be seen from the illustration, only a small amount of the belt is utilized. The joint being practically a hinge, it passes over pulleys noiselessly and without slippage or friction, reducing vibration and wear upon the bearings. This machine will lace a belt 24 inches wide as easily and quickly as the smaller sizes and the lacing will be the same on both sides, flush with the surface in every instance. The joint is of uniform strength across the full width, so that the belt will run on flange pulleys without whipping the edges, even when used on belts which are crossed. Another unique feature is that the belt may be connected and disconnected at will. That these machines are approved by government engineers is evident from the fact that they are employed in the shops of nine of their large plants.

THE UNIVERSAL PASTING MACHINE.

The illustration shows a machine manufactured by the Willcox Manufacturing Co., 136 Liberty St., New York, for pasting labels. It is extensively used by textile mills, department stores and other manufacturing and commercial concerns that apply their own labels to the goods. A reservoir at the base of the machine contains the adhesive. The labels are fed between the rolls which are

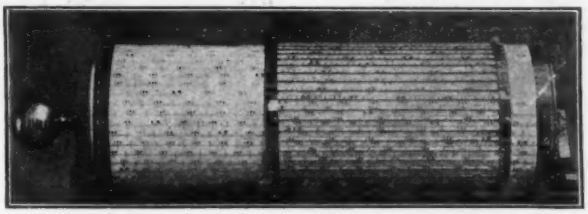


THE UNIVERSAL PASTING MACHINE.

driven by the crank. The proper amount of paste is evenly distributed on the surface of the label, the surplus running back into the reservoir and thus preventing all waste. The printed side is kept clean and as a result the work is done neatly and uniformly in a manner far superior to the old methods with the paste pot and brush. The greatly increased amount of work that can be done by one operative with this machine is also an important advantage. The machine is simple, durable, inexpensive and requires no special skill for its operation. It is built to be driven by power or by hand, as desired, and is used in all industries that require paper labels, tags or sheets to be pasted to boxes, samples, bottles or other articles. Further information can be obtained on application to the manufacturers.

A CALCULATING MACHINE FOR TEXTILE MILLS.

The calculating machine shown in the accompanying illustration has long been in use on the Continent of Europe and is now being introduced to the American trade by Alfred Suter, 487 Broadway, New York. A



A CALCULATING DISC.

number of American silk mills have used this machine with satisfactory results for a number of years. It is based on the principle of the slide rule and with the W 10 cylinder the length of the scale is over ten yards, giving results in six figures. The machine can be used for calculating wages of the operators,

A CALCULATING MACHINE.

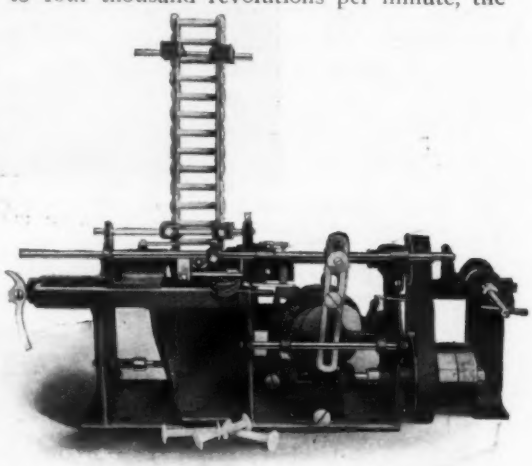
operating cost, yarn counts, analysis and cost of cloth, ends in warp for goods of different widths, length of warps, amount of yarn to be prepared, amount of sizing, dyestuffs or chemicals required, interest accounts, and for many other purposes. In all of these operations a large amount of time can be saved by the use of this machine.

The use of the machine is illustrated by the following examples: Suppose the rate per hour is 15½ cents for a certain class of labor and that a number of hands work 52, 53½, 52¾, 50 and 62 hours per week respectively. By moving the zero mark to 15½ the weekly wage for all of these operators can be obtained by reading the numbers corresponding to 52, 53½, 52¾, 50 and 62 on the slide. Again, if it requires 154 pounds of warp yarn to make a warp of a given density and length, 64 inches wide, how many pounds would a 72 and 80-inch warp require? The 64 mark on the slide is placed above the 154 mark on the cylinder and the numbers that correspond to 72 and 80 are then obtained. Suppose that a fancy warp requires 164 pounds of No. 30 yarn with 2016 threads in the warp, of which 460 are white, 520 black, 710 green and 326 red. What quantity of each color does it require to make the warp? The 2016 mark on the slide is placed above the 164 on the cylinder and the respective quantities of yarn required are obtained by reading the numbers opposite 460, 520, 710 and 326. These calculations can be made with a single setting of the machine, the inner scale serving as a slide. The cylinders and discs are made of different sizes to meet all requirements. Mr. Suter will give full information to manufacturers and demonstrate the value of this appliance in textile mill work.

American cotton-cloth mills sold $1,984,536 worth of their products to the Philippines during the first nine months of 1910, against $385,544 in the same period of 1909. However, the sale of British cotton goods in the Philippines did not decrease, being $2,007,949 during the first nine months of 1910, against $1,045,225 in the 1909 period.

AUTOMATIC DOUBLE HEAD BOBBIN WINDER.

The illustration shows the automatic double-head bobbin winder built by F. A. Lazenby & Co., Baltimore, Md. This machine is used for winding the filling for narrow fabric looms. The empty bobbins are placed in the vertical hopper shown in the illustration. An arm at the back of the machine takes one of these bobbins at a time and delivers it to the live spindle which revolves three thousand to four thousand revolutions per minute, the



THE NEW LAZENBY DOUBLE HEAD BOBBIN WINDER.

speed depending on the strength and size of the yarn. When the bobbin is wound to the desired diameter the traverse stops and holds the thread at one end until the tail stock opens, allowing the full bobbin to drop into a receptacle below. A pair of scissors automatically cuts the yarn, the lever at the back delivers an empty bobbin to the spindle, and the operation is then repeated. All that the operator is required to do is to keep the hopper filled with empty bobbins and replace the spools from which the yarn is wound. One operator can attend to a numer of winders, thus reducing the cost to a minimum.

Many of these winders are in operation in mills weaving hat bands, lampwicks, ribbons, suspender webbing, elastic and non-elastic webbing and similar fabrics. Before installing the Lazenby machine it was the custom to attach to each loom a winder

into which the weaver placed an empty bobbin by hand, removing it when full. This occupied much of the time of the weaver and reduced the production of the loom. By having the filling wound on the Lazenby machine the weaver can devote her entire time to the running of the loom. One operator can run ten or twelve Lazenby winders and prepare the filling for a large number of looms. The Lazenby winder has been thoroughly tested in the mill with most satisfactory results. Further information can be obtained from the builders, who will take pleasure in referring those interested to mills using the machine.

A NEW METHOD OF REDUCING LINE SHAFT FRICTION.

The proper alignment of shafting is an important problem in every factory, especially where the machinery is heavy and where the floors are subject to shifting loads of any considerable amount, or where the lines are long and of various sizes, as in textile plants. Turning long lengths of shafting requires at best a considerable amount of power, and a poorly-hung line shaft eats up more coal than is usually realized. Probably the greatest waste of power in the average factory can be charged to line shaft friction. Old methods of truing up a shaft are not only inconvenient, but inadequate as well, and only approximate results can be secured. Frequent inspection of the shafting, especially in textile mills, is an absolute necessity if one would secure the full benefit of their power.

Recognizing the importance of keeping the shafting in good order the Kinkead Manufacturing Company, 7 Water street, Boston, Mass., designed apparatus for this work, and they claim that by its use it is possible to level an align 250 feet of shafting between the time of shutting down a mill at six o'clock and nine o'clock in the evening. The Kinkead apparatus consists of a special level, built particularly for indoor work, and capable of sighting clearly on a line of shaft 600 feet long either by day or night; a self-centering target which is hung from the shafting by an ingenious jaw clamp, so constructed that it not only finds the centre of the shafting, but remains invariable, irrespective of the changing size of shafting and variation due to the changing of diameter, and a fixed or stationery target used as a check to insure uniform readings and results. The portable target is capable of arrangements and adjustments

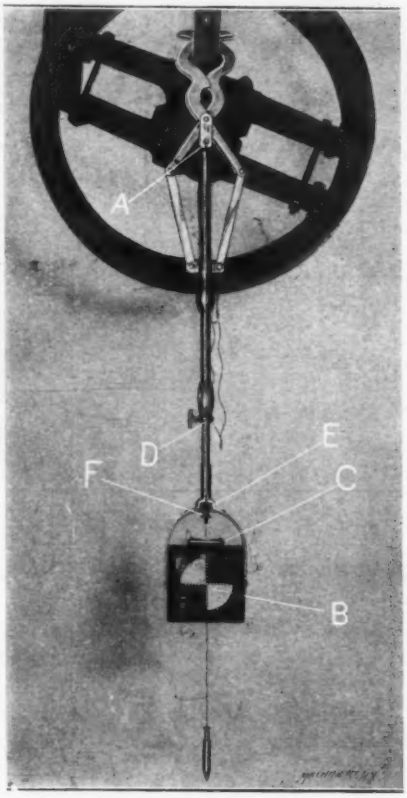


FIG. 1. A PORTABLE TARGET.

which enable the operator to work on any of the various kinds of shafting, whether overhead, in pits, on piers, under tables, and on shafting with or without obstructions under or over it. The offset feature of this target enables one to work without removing any belts. The faces of the targets are transparent, and by the use of special lanterns furnished with the outfit, the work can be done as successfully by night as in

the daytime, eliminating entirely the necessity of shutting down to do this particular work.

Fig. 1 shows the portable target as it

FIG. 2

hangs from an overhead shaft, and Fig. 2 shows the ordinary method of using the

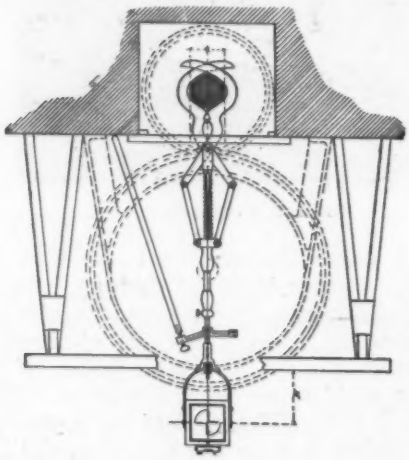


FIG. 4.

outfit. Fig. 3 shows a very common difficulty where, owing to the location of a machine or other obstructions, it is impossible to get a sight directly beneath the shafting, so that the offsetting line has to be resorted to. In this case, a special offset is provided which is used to bring the device in the vertical position. Fig. 4 shows the method of working on a shaft in a pit or beneath the floor.

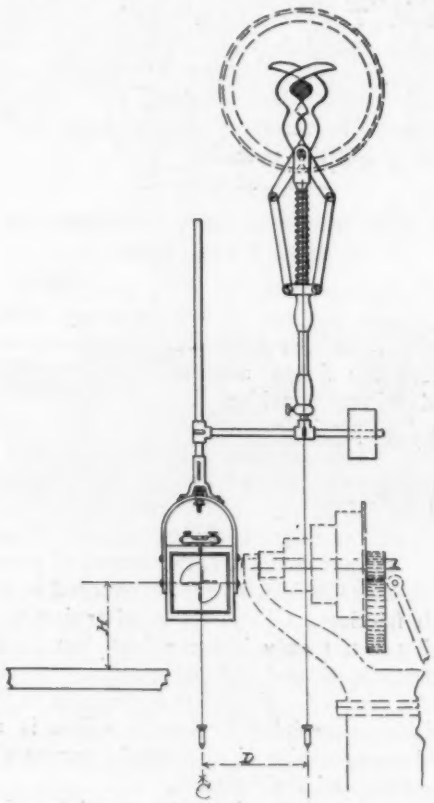


FIG. 3.

In this case the portable target is reversed and supported in an upright position by an adjustible leg at the side as shown. For shafting located on piers, the arrangement shown in Fig. 5 is employed, which is preferable, as the shafting is usually very heavy and the horizontal position enables the operator to work from the floor.

All the arrangements described provide for the accurate locating of both the engineer's level and the fixed target in positions convenient to the operator, which per-

mit of the accurate alignment of the shafting, the alignment and the leveling being done at one operation. This method is simple, accurate and economical. The special training of an expert is not necessary. Any intelligent millwright or mechanic can use it. The absolute accuracy with which the work is done shows surprising results in the way of saving power. The rapidity with which the operator can work, it requiring only two men to adjust any line which can be done in one-fourth of the time required by any other method, reduces the expense to a minimum. The ability to work as successfully by night as by day is a most important factor, as it eliminates the necessity of shutting down and losing valuable time.

Another feature of the apparatus is that when for any reason it is found that a line shaft cannot be made absolutely level without much labor and expense, the line can be graded in, giving equally as good friction results without resetting all hangers or boxes. Tests have proved conclusively that the saving of surplus friction on line shafts results in a saving in the coal pile or electric meter as well as added efficiency in the plant. The effect is also seen in a more uniform speed, and the sudden speeding up and "quick jerks" on the various machines almost entirely disappear.

The number of active cotton spindles in the world has increased from 105,681,000 in 1000 to 134,526,000 in 1910.

POWER DISTRIBUTION IN SPINNING FRAMES.

By Albert Walton of the Westinghouse Electric & Mfg. Co.,

When a machine is driven by its own motor, tests with a graphic meter will reveal many interesting facts concerning its operation and production. Delays and stoppages, as well as excessive friction loads, are readily detected and the opportunities for improvements made evident. The improvements suggested by graphic meter tests include not only the removal of excessive friction and the betterment of surrounding conditions, but also the modification of the machines themselves. A

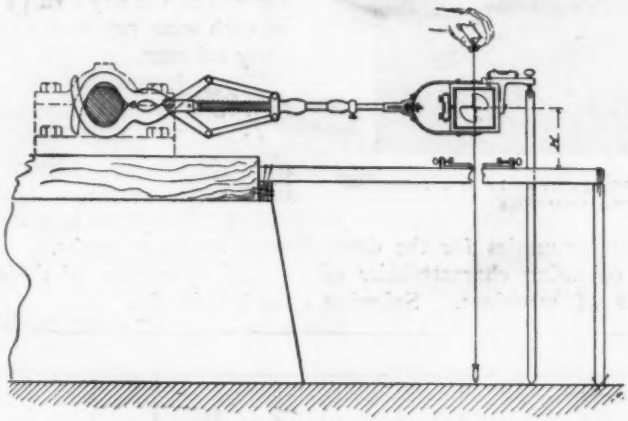


FIG. 5.

detailed study of the operation of the machine can be made with a view to an understanding of all the factors which affect the power requirements. In the past the only method of determining the power changes has been by taking a series of indicator cards from the steam engine driving the entire mill or section of a mill, or by reading the input to an electric motor driving a section of the mill. The natural result is that nothing definite has been determined about the requirements of any one machine. It has been determined that the power required by spinning frames as a class decreases materially in the first 15 minutes after the frames are started both in the morning and again at noon, and that the total power usually is a minimum just before quitting time in the evening. But just how and why the power varies in any machine cannot be determined from such tests.

With the records from the graphic meter the individual performance of any motor-driven machine may be fully investigated. The commercial development of this meter and of individual motor drive has been almost simultaneous and both are required in procuring these records. The many and successful applications of Westinghouse textile motors to individual textile machines have afforded excellent opportunities for the determination of the operating characteristics of the various types of machines. Spinning frames, which present perhaps the most complicated conditions because of the various elements involved, will be considered here.

FIG. 1. SPINNING ROOM DRIVEN BY WESTINGHOUSE TEXTILE MOTORS.

In Figs. 2 and 3 the complete record of a 256-spindle Whitin spinning frame is shown for a full day's run. The curve is to be read from right to left, Fig. 3 following on directly after Fig. 2, as they are parts of the same day's run. The record consists of three main parts from 5.55 a. m. to 8.07 a. m., from 8.10 a. m. to 1.38 p. m. and from 1.45 p. m. to 6.20 p. m. The frame was started at 5.55 a. m. with the bobbins about three-quarters filled, and was run till 8.07 a. m., when the bobbins were filled and the frame and motor stopped. The full bobbins were replaced by empty ones in three minutes and the motor started at 8.10 a. m. It required until 1.38 p. m. to fill these bobbins, including the idle time of 40 minutes during the nooning. At 1.45 p. m. a new start was made with empty bobbins which were just completely filled at the end of the day's run. The complete cycle in each case required about four hours and forty minutes.

Three features of the curve are particularly noticeable and require explanation.

(1) The power with the bobbins full is about 20 per cent. greater than with the bobbins empty.

(2) The curve is a regular recurrence of small waves or peaks.

(3) The form of these peaks changes as the bobbins fill.

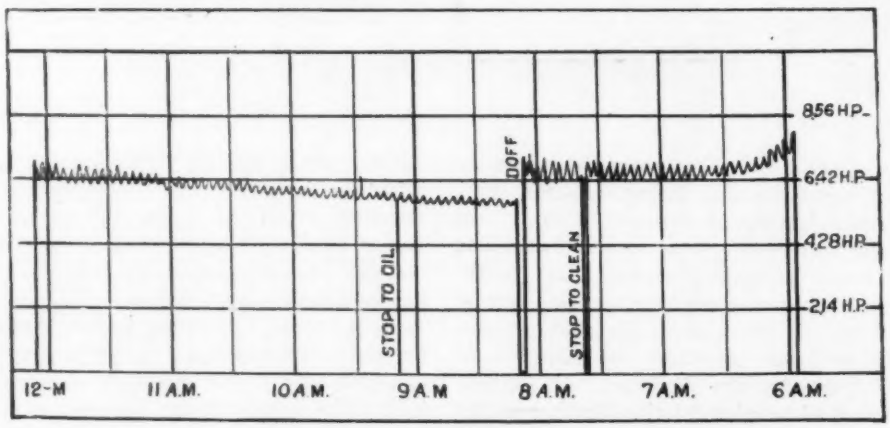


FIG. 2. GRAPHIC METER RECORD FROM WHITIN 256 SPINDLE SPINNING FRAME DRIVEN BY WESTINGHOUSE TEXTILE MOTOR MORNING HALF OF DAY'S RUN.

Why is the power so much greater for the full spindles than for the empty spindles? The answer which first presents itself is that the increased weight on the spindles causes increased friction and hence greater power. But from tests of the power required it has been determined that the increased weight

has practically nothing to do with it. The frame was tested with all the moving parts disconnected except the cylinder, bands and spindles, the bobbins were full, but there was no spinning in progress as the rolls had been disconnected. There was therefore no traveller drag and no roll nor creel power to consider. The power required was 4.9 horse-power. The full bobbins were then removed and the bare spindles allowed to run. The power was 3.9 horse-power or a decrease of one horse-power by the removal of the loaded bobbins. If all of this drop were due to the additional weight of the bobbins, by placing empty bobbins on the spindles the power should be increased in the proportion that the weight of the empty bobbins bears to that of the full bobbins, which is about one-half. As a matter of fact the addition of the empty bobbins did not increase the power sufficiently to make an appreciable difference. Hence it is evident that the increased weight does not account for the increase in power.

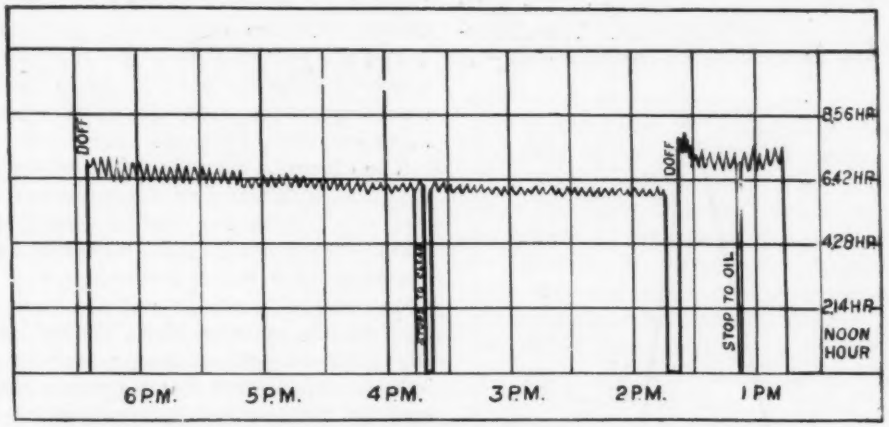


FIG. 3. GRAPHIC METER RECORD FROM WHITIN 256 SPINDLE SPINNING FRAME DRIVEN BY WESTINGHOUSE TEXTILE MOTOR AFTERNOON HALF OF DAY'S RUN.

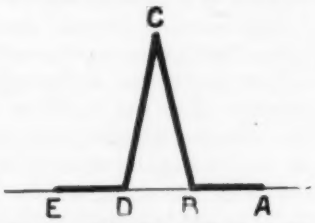


FIG. 4. ENLARGED VIEW SHOWING FORM OF POWER PEAK WITH SPINDLES EMPTY.

The most likely theory is that the increased power is due to the fanning action at the surfaces of the bobbins. Neither the bare spindles nor the polished wood bobbins cause any appreciable disturbance of the air because the surfaces are so smooth. But as soon as a few layers of cotton are wound on the bobbins the immense number of minute fibers projecting into the air from the surface of the cop stirs up the air quite vigorously. Simultaneously with their ability to stir up the air, the peripheral velocities are augmented by the increase in diameters and this change increases the power very markedly, as the power required to move air varies with the cube of the speed. The fact that the air is actually stirred up may be readily observed by the crude method of feeling the effect on the bare hand or face, or by holding a fine strand of yarn near the spindles. When empty almost no air motion is perceptible, but when full a strong, vigorous circulation is set up and the air is violently agitated for the entire length of the frame.

The second item of interest shown by the curve, the recurrence of the small peaks, is due to the traverse of the ring rail. At first thought it would appear that these peaks are caused by overcounterweighting, since the power increases as the rail descends and vice versa. But if this were so the shape of the curve would be a series of abrupt increases when the rail began to drop, and abrupt drops when the rail began to rise, with level spaces

between. Again, the height of the variations would decrease as the bobbins filled, but such is not the case, as the height increases. The real cause may be found by a consideration of the third item, the change of the wave form.

The third item is the change of the form of the peaks as the bobbins fill. The character of the peaks with the bobbins empty is

FIG. 5. ENLARGED VIEW SHOWING FORM OF POWER PEAK WITH SPINDLES FULL.

shown much enlarged in Fig. 4, while Fig. 5 shows the peaks when the bobbins are well filled.

It is well known that the pull on the yarn is greatest with the empty bobbins (witness the greater breakage then), due to the difference in the angle of the pull. The pull tangential to the ring remains constant because the speed and hence the friction remain constant, but the total pull on the yarn is materially greater with the empty bobbins because it is more nearly at right angles to the tangential pull. This increased tension is sufficient to prevent ballooning almost completely with the bobbins empty, except when the ring rail is in the lower half of its traverse, where the greater length of the yarn allows ballooning. With the full bobbin the ballooning is so pronounced that separators have been placed between adjacent spindles to prevent the actual interference of the yarns. The force necessary to propel each strand of yarn through this space about each bobbin is small but appreciable and when multiplied by the total number of spindles is sufficient to be distinctly evident. The greater power required to propel the yarn while ballooning is due largely to the movement of the yarn through air which is either nearly at rest or else has a motion opposite to that of the yarn. When the yarn is tight it revolves in the air which is propelled by the spindle itself and travelling at the same rate as the yarn and hence cuts very little air.

The change in the form of the curve proves that this explanation of the peaks is the correct one. With the bobbins empty it may easily be observed that ballooning begins when the ring rail is about half way down and continues until the rail has risen again to about the same position. By reference to Fig. 4, showing the enlarged peak with empty bobbins, it is evident that the power remained constant till the rail had passed somewhat beyond mid position. Then it rose rapidly to its maximum, when the ballooning was greatest with the rail at its lowest position from that point it rapidly dropped as the balloon was drawn in. Fig. 5 shows that ballooning starts immediately when the rail leaves the top position and continues to increase until the rail is in the lowest position, and then decreases again.

The total then is a combination of the two effects of increased air friction due to the fanning action of the yarn on the spindle and the undulations due to the ballooning. It is usually supposed that the traveller drag is an important portion of the power required by ring frames, but as a matter of fact this drag is constantly decreasing as the bobbins fill and yet the power is constantly increasing, hence the traveller drag can have little effect on the power as compared with the air friction.

Other interesting details are shown by the curves. It will be noticed that just before the doff at 8.07 a. m. and again at 1.38 p. m. the curve becomes ragged and irregular. This is due to the bobbins having become overfilled so that they rubbed against the rings and the travellers. In the run from 8.10 a. m. to 1.38 p. m. we can count 78

traverses of the ring rail, while from 1.45 p. m. to the close of the day when the frame was again ready to doff but 75 traverses occurred and no interference was noted. The curve also shows that stops were made at irregular intervals to put on broken bands and to clean the frame at the driving end.

PAPER TWINE FOR TYING WOOL.

By Our Special English Correspondent.

As stated here a month ago, wool users in England are opposed to the use of any kind of twine in tying fleeces. Since then, opportunity has occurred to show to some wool buyers samples of a paper twine which has been used for this purpose. Their verdict is that paper is preferable to fibrous yarn, but is not so good as a simple hand-made twist of wool from the fleece itself. They urge that no necessity exists for tying fleeces firmly and they particularly object to the knotting of any material used to hold the fleece together. Untying knots takes up time, especially when some wool is caught in the loop, and where farm twine is used it is almost impossible to get rid of the tie without at the same time losing a little wool and leaving a little vegetable fiber behind to remain as a nuisance. There is one tie made of wool to which dealers and manufacturers object even more than to vegetable string. The Kent farmers make a rope out of tar-marked wool, using the belt and hand-winder that they employ in making straw rope for haystacks. This cord they knot firmly round the fleece with the consequence that the sorter is longer in opening the fleece than in sorting it. If the tie is cut, the fiber is shortened at every cut, and in any circumstances the twist, the tar and the knot in combination lead to superfluous profanity on the part of sorters working at piece rates and to readily avoidable waste of material.

Paper twine is itself an object of some interest, in view of the new uses being found for paper yarn. A four-ply twine of apparently about 100 yards to the pound has been compared by cordage manufacturers to their regular productions.

By all accounts paper yarn is made cheaply. Eminent London accountants have certified that the pulp yarn made by one German company is produced for less than 3½ cents per pound (supervision, establishment expenses and depreciations not included) and is sold at nearly 6 cents. According to another account, the labor cost of producing one kilo (2.2 pounds) of paper yarn is ⅔ cents in Saxony. The cost of making plies for twine or inserting a core of flax inside the paper twist is presumably additional. Although paper yarn has been known in the Manchester market for at least seven years little has been done in weaving it hitherto in England. Its use in company with jute in Germany is recognized. Bagging made half of paper was a few years ago a source of serious loss at Bombay. A cargo of grain packed in these bags was damaged because the bags split when being hauled from the hold. Apparently more is to be heard of paper yarn and cloth as the Kellner-Partington Wood-pulp Company are taking an interest in weaving experiments at Glossop, England, where paper-filling is being crossed over a cotton warp. A canvas-like cloth, brown in color and bulky for its weight, is being made in the same way in Burnley. A Swedish patent is coming forward under which pulp goes in at one end of a machine and spun and finished paper yarn comes out at the other. It is understood that the Germany yarn is made by slicing reeled paper into ribbons, twisting these subsequently, and passing them through frictional eyelets to impart roundness to the thread.

Mention is made of paper cloth as a possible substitute for jute in wool bagging, and the claim is made that pulp cloth would be less liable to introduce vegetable matter. Practical men immediately ask: "How about stretching?" and speculate on what will happen when a press-packed bale is freed from the compression of the ram and the stitches and the fabric have to withstand the strain from within. The matter will possibly be determined by experiment, but it would be wrong to say that pulp bags are universally expected to stretch and to carry 300 to 400 pounds of wool safely for 12,000 to 15,000 miles with incidental handling in transit.

Mill News

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires, facts and gossip of the trade are referred to the TEXTILE ADVANCE NEWS, issued weekly by the publishers of the TEXTILE WORLD RECORD, at $15.00 per year.

COTTON.

New Mills.

*Georgia, Monticello. A prospectus of the Castle Cotton Mills, Ltd., to be built at Monticello, has been issued and is being sent to possible investors. The capital is to be $1,000,000 common stock with an issue of $250,000 preferred stock. It has not been decided when the first payments of stock will be called as no date has been set for beginning building operations and subscriptions are conditional on at least $600,000 being raised. The plant will be located outside the city limits of Monticello, and will be of reinforced concrete construction, electrically equipped throughout, current to be furnished by the hydro-electric power development on the Ocmulgee River, which is about nine miles away. The proposed equipment is 50,000 spinning spindles, 5,000 twister spindles and 1,200 Northrop looms to be operated on goods designed for the domestic converting trade. A board of fifteen directors has been elected, including prominent and successful business men of Monticello. The mill will be under the control of Wm. T. Lang, formerly of West Point, who recently moved to Monticello, and who was for a number of years agent of the Brookside Mills, Knoxville, Tenn. The directors are as follows: W. J. Massee, Macon, Ga.; L. O. Benton, D. B. Benton, J. L. Benton, Eugene Benton, R. S. Talmadge, R. L. Furse, Sam Cohen, J. A. Kelly, J. H. Kelly, E. D. Kelly, E. C. Kelly, D. N. Harvey, W. J. Phillips, E. T. Malone, P. W. Malone, J. S. Malone, Jr., E. H. Jordan, A. M. Spears, H. V. B. Allen, R. L. Davis, Doyle Campbell and Wm. T. Lang, of Monticello. Plans and specifications will be prepared by Fred S. Hinds, mill architect and engineer, Boston. The main mill will be 4 stories high, 500 by 129 ft. There will also be a boiler house for heating and slashing, ten cotton houses, 50 by 100 ft. each, and 125 operatives' cottages.

*North Carolina, Chapel Hill. The plant of the T. F. Lloyd Mfg. Co. is expected to be completed next month. The main building is 1 story high, 127 by 287 ft., built at a cost of about $40,000. 10,000 spindles with preparatory machinery will be installed for making cotton yarns. A 300 h. p. steam plant will supply power. R. J. Dalton is the engineer in charge. The T. F. Lloyd Mfg. Co. was incorporated in 1910 with capital stock of $200,000 and is headed by T. F. Lloyd, who at one time operated the Alberta Cotton Mills at Chapel Hill.

*South Carolina, Cheraw. The proposed Chesterfield Cotton Mills will be organized with capital stock of $250,000 and will build and equip a mill of 10,000 spindles. D. L. Tillman of Cheraw and Z. T. McKinney of Martinsville, Virginia, are the promoters.

South Carolina, Greenville. The Crown Cotton Co. has been incorporated with capital stock of $35,000 to manufacture products from waste. A plant will be built during the summer and will be put in operation before fall. The incorporators are Ellison A. Smyth, Lewis W. Parker, R. F. Bowe and W. E. Beattie. A meeting will be held next week, after which information can be given as to officers and details of the company. It is probable that this new company is to handle the waste of the cotton mills in the vicinity of Greenville on the basis that the waste of mills in Lowell and Lawrence is handled by the Merrimack Utilization Co. and the Northern Waste Co., respectively.

*South Carolina, Greenville. At a meeting of stockholders of the Dunean Cotton Mills the following officers were elected: J. Adger Smith, Jr., president and treasurer; Ellison A. Smyth, vice-president; Claude D. Smyth, secretary. These men with C. O. Allen and H. J. Haynesworth are the directors. Details of the proposed 50,000-spindle and 1,500-loom mill have been given previously.

*South Carolina, Newberry. One story of the main building being built for the new Oakland Cotton Mills has been completed by the Fiske-Carter Construction Co. This main building will be 4 stories high, 130 by 216 ft., and as noted in earlier reports will be equipped with 20,000 spindles and 500 looms. Contract for 70 operatives' cottages will soon be awarded. Lockwood, Greene & Co., Boston, are the architects and engineers.

*South Carolina, Prosperity. It is probable that the organization of the proposed cotton mill company will be completed in time to begin the building of a plant in the summer or fall. The plan has been agitated for months and calls for a $200,000 company to build a 10,000-spindle mill. Geo. Y. Hunter, president of the bank of Prosperity, heads the enterprise.

*Texas, Wichita Falls. At a mass meeting of citizens $150,000 was subscribed toward the capital of the $400,000 cotton mill company. It was announced that an experienced cotton manufacturer has agreed to take the active management and to invest $200,000 if a like amount is raised locally.

*Vermont, Brattleboro. Plans which have been drawn for the Fort Dummer Mills Co. provide for a larger plant than was originally planned and call for a main building, 320 ft. long, 118 ft. wide and 3 stories high, which will contain approximately 113,000 ft. of floor space, an increase of about 18,000 ft. Edward G. Chase, treasurer and manager, is considering contracts. Fine lawns are to be manufactured on 35,438 ring spindles and 650 looms.

Enlargements and Improvements.

Connecticut, Wauregan. Some of the departments of the Wauregan Co. are to be remodeled and additions made, and contracts for this have been awarded to the H. P. Cummings Construction Co.

Georgia, Barnesville. The Aldora Mills are replacing some of their mule spindles with ring frames and plan to build an addition at an early date and install 400 looms.

Georgia, Savannah. A fireproof warehouse, 46 by 152 ft., will be built by the Savannah Cotton Mills. An increase in the manufacturing capacity is also under consideration. G. H. Tilton & Son, Tilton, N. H., are the proprietors.

Louisiana, New Orleans. Contract has been awarded by the Lane Cotton Mills for additional machinery equipment, including new pickers. This is the new corporation which has taken over the Lane Mills, formerly included in the Textile Mills Corp.

*Maine, Biddeford. Contract has been awarded by the Pepperell Mfg. Co. for the cement for the proposed new weave shed, to be built on the site of the buildings which are now being torn down, to Andrews, Horrigan Co.

*Massachusetts, Fitchburg. The proposed addition to the Grant Yarn Co. is to be three stories high, 70 by 75 ft. George P. Grant, Jr., treasurer of the concern, states that no new machinery will be required as some of the present equipment will be removed to the new building when it is built.

Massachusetts, Shattuckville. One thousand new spindles have been installed in the Massaemet Yarn Mills to replace old spinning equipment.

New York, Lockport. B. D. Schuyler has been awarded contract for the erection of the reported addition to the plant of the Lockport Textile Co. on Park Ave. Work will be started at once. It has been previously reported that the present capacity will be doubled on the completion of this enlargement. Cotton and linen towels are manufactured on equipment of 60 looms.

New York, Oswego. An addition to the plant of the Standard Spinning Co., a branch of the Frisbie & Stansfield Knitting Co., of Utica, on which construction work was started late in 1910, is practically completed. It is 100 by 40 ft., and will be used at first for storage, although it is expected spinning equipment will be installed later.

North Carolina, Castonia. The directors of the Flint Mfg. Co. have decided to add 2,500 spindles to the equipment.

*North Carolina, Durham. The addition to the bag mill of the Golden Belt Mfg. Co. has been completed and will be used for bag printing and storage. The equipment will be removed from the present bag printing department and this will leave space which will probably be filled up with new manufacturing equipment. The addition is 3 stories high, 75 by 120 ft., and cost about $25,000.

*North Carolina, Hillsboro. Raw stock and yarn dyeing will be done in the new dyeing department being erected for the Belle Vue Mfg. Co. Work was started on the addition, which will be 75 by 50 ft., of brick and oak construction, on March 1 and it is expected it will be ready for operation by May 1. This concern manufactures ginghams on 5,000 ring spindles and 200 looms, operated by steam power. T. N. Webb is treasurer and buyer and J. W. Knight is superintendent.

North Carolina, Lincolnton. Two new cards and a new twister have been purchased by the Eureka Mfg. Co. This concern makes waste yarns, 2s to 5s, in single and 2-ply.

*North Carolina, Newton. The weaving department to be added to the Newton Cotton Mills will be equipped during April.

Pennsylvania, Philadelphia. The Hohlfeld Mfg. Co., now at 8th and Dauphin Sts., has placed a contract for the erection of a three-story mill at 10th St. and Sedgeley Ave., 62 by 249 ft., also for a storage building, 21 by 116 ft., three stories high, and a one-story power plant, 24 by 104 ft. The total cost will be in the neighborhood of $250,000. This concern manufactures hammocks, lenos, cotton goods and fancy knit goods, operating 10 knitting machines, 10 broad and 30 narrow looms.

Pennsylvania, Philadelphia. It has been decided to rebuild the hair cloth plant of Gordan Bros., Inc., located in Frankford, which was recently destroyed by fire with loss of about $100,000. The plant contained 200 looms, and about one-half of this number have been installed in another part of the plant and are now in operation.

Pennsylvania, Philadelphia. Following up a report recently made by us that the Bolton Spinning Co. had been removed from Howard and Berks Sts. to the mill vacated by the Friedberger-Aaron Manufacturing Co., at 18th St. and Fishers Lane, it can now be said that the Bolton Company has been succeeded by the James & William G. Henry Co., Inc., who in addition to operating the equipment of the old company will install additional machinery on which they will continue the manufacture of cotton yarns for the upholstery trade.

Rhode Island, Berkeley. The new weave shed of the Berkeley Co. has been completed and the first installment of looms from the Draper Co. has been received and will be installed immediately. A new boiler, engine and generator are being set up.

South Carolina, Fairmont. Two hundred dobby heads are being put on looms by the Fairmont Mfg. Co. It is reported that additional looms and machinery will be installed at an early date.

South Carolina, Greenville. About 1,000 new automatic dobby looms will be installed by the F. W. Poe Mfg. Co., replacing 750 plain looms. As noted previously, 10,000 spindles are being added, giving a total of 70,000 spindles. Several months ago the capital was increased from $500,000 to $1,000,000.

South Carolina, Rock Hill. The Manchester Cotton Mills have installed 86 new Northrop looms.

*Tennessee, Cumberland Gap. An addition is being built by C. E. Goodwin & Sons, lessees of the Cumberland Gap Woolen Mills, in which they will manufacture cotton warps in connection with their woolen business. They have contracted for 1,400 spindles. The woolen department consists of two sets of cards, 520 mule spindles, 12 narrow looms and six broad looms which have recently been added. Within a short time two more broad looms from the Knoxville Woolen Mills will be installed. They manufacture flannels, blankets and coverlets.

*Tennessee, Humboldt. The Humboldt Cotton Mills will put in new twisters and winders, but the number has not been decided upon as yet.

*Texas, Cuero. The Cuero Cotton Factory has reorganized and elected J. C. Saunders of the Bonham (Texas) Cotton Mills president and general manager; W. M. Ratcliffe, vice-president; Joseph Sheridan, secretary and treasurer. Mr. Sheridan was treasurer of the old company. The capital stock is $125,000 and an expenditure of $50,000 is planned to enlarge and improve the plant, as outlined some time ago. At present there are 5,000 ring spindles and 160 looms operated by electric power on sheetings.

Mills Starting Up.

*Alabama, Oxford. Alfred Miller of Philadelphia is president of the Southern Mills Corp. and James E. Bodine, also of Philadelphia, is treasurer. As noted previously, Otto Latsch is superintendent; W. F. Osler, buyer. The mill, which was formerly known as the Planters' Mfg. Co., is being started up and at present is in part operation.

WOOLEN.

New Mills.

*Arizona, Tempe. The $25,000 bonus offered for the location of a woolen mill here has been donated and it seems probable that a mill will be built along the lines stated in an earlier report. W. J. Kingsbury, A. J. Peters and C. G. Jones are local men who are prominently identified with the movement.

Pennsylvania, Philadelphia. Thomas Henry, Jr., has leased the second floor of the building at Howard and Berks Sts., which he is equipping with 4 sets, 1,000 mule spindles on which he will spin carpet and upholstery yarns.

Pennsylvania, Philadelphia. The Crescent Spinning Mills recently reported by us as about to start up at Howard and Berks Sts., are now getting their machinery ready for operation. The equipment will consist of 2 sets cards and 2,000 mule spindles which will be run on woolen yarns, 2/6 to 1/40 cut for weaving and knitting. The company has capital of $20,000, John Dale, president, and Henry W. Grant, treasurer and superintendent.

Pennsylvania, Philadelphia. A charter has been applied for by the Ferguson Carpet Co., with Norman W. Cramp, Gloss K. Mohr, and Lincoln A. Ferguson, formerly with James Pollock & Son, carpet manufacturers of this city, as incorporators. The plant will contain 20 looms which will be operated on Wilton carpets. A location has not yet been secured. The company will have a capital of $30,000.

Enlargements and Improvements.

Connecticut, Bridgeport. Plans have been drawn by Joseph W. Northrop for an addition to the Salt's Textile Mfg. Co. on Howe St. and contract for construction work has been awarded Schwartz Bros. The new building will be 75 by 125 ft., 1 story high, of frame construction with gravel roof.

*Connecticut, Putnam. Work of removing the present equipment of looms from No. 2 Mill of the Putnam Woolen Co. has been begun. Thirty-two new Knowles looms will be installed to replace them as noted previously. Both mills of this company are running to full capacity.

*Georgia, Rossville. All the necessary equipment for the previously reported addition to the Peerless Woolen Mills has been purchased. They are installing 40 broad looms and preparatory machinery.

Indiana, La Porte. A set of cards and 10 new looms are being added to the equipment of the La Porte Woolen Mills.

*Maine, North Monmouth. The proposed new mill of John H. McIlroy Son & Co. is only contemplated and it is not absolutely certain that it will be built. Plans call for a 4-story mill, 200 by 70 ft., of brick construction. If the town will not increase their taxes for ten years, it is probable the mill will be built and the output of the company largely increased. A new napper is being set up in the finishing room.

*Massachusetts, Caryville. The addition being built to the plant of the Taft Woolen Co. for drying purposes will be 40 by 15 ft.

Massachusetts, Holyoke. Contract has been awarded by the Farr Alpaca Co. for their new weave shed on Bigelow St. The building will be one story and basement and will cost in the neighborhood of $150,000. Looms will be the only equipment.

Massachusetts, Jefferson. The Jefferson Mfg. Co. is installing 6 broad looms in the lower mill.

Massachusetts, Lawrence. Business is improving at the mill of Walworth Bros. and the looms are being filled with warps as fast as possible. A new shear and a new press of the latest design have been installed in the finishing department.

Massachusetts, Lowell. During the summer the Bigelow Carpet Co. will further enlarge its plant by the erection of a new dye house to take the place of one of the old dye houses. It will be three stories high.

Massachusetts, Uxbridge. Twenty Knowles looms purchased at the recent sale of the Knoxville Woolen Mills will be set up in the plant of the Uxbridge Worsted Co. This machinery was bought by Charles A. Root, who attended the sale.

Massachusetts, Uxbridge. New looms have arrived at the Rivulet Mills and are being set up under the direction of Lawrence Keegan, Jr., who will have charge of the plant. New floors have been laid in the weave room and other parts of the property have been repaired.

New Hampshire, Franklin. A small amount of the machinery equipment of the Middlesex Mills, Lowell, has been purchased by M. T. Stevens & Sons Co. and is being installed in the Franklin Mills, replacing machinery which is being discarded.

New York, Albany. Contract has just been awarded by F. C. Huyck & Sons, manufacturers of felts, for an addition 3 stories high, 110 by 88 ft., to be completed in the summer. New machinery equipment will be installed.

*Ohio, Cleveland. The new 3-story mill of the National Woolen Co. is expected to be completed in April. The first two floors will be used for storage at first, provision being made, however, to convert them into card rooms at a later date. The top floor will be used for sorting purposes. The company contemplates making alterations to one of the other buildings during the year, converting them into a dye house. A new carbonizing department is also under contemplation, the property adjoining the plant having been acquired for this purpose.

Pennsylvania, Philadelphia. The Philadelphia Carpet Co., 5th and Columbia Ave., manufacturers of high class carpets, with Walter Benham as superintendent, have taken over the section of the mill recently vacated by the Delaine Mills, who removed to Manayunk; new looms and printing machines have been added and they are now operating 58 looms and 18 printing machines.

Pennsylvania, Philadelphia. George W. Lefferts & Co., spinners of worsted yarns up to 32s on the Bradford system, report that they have increased their spindles to 2,700 and are about to install another set of drawing. They are running to their full capacity, with plenty of business on hand.

Pennsylvania, Philadelphia. The weaving capacity of the Bradford Mills, owned and operated by John & James Dobson, at Stenton and Godfrey Aves., Germantown, will be increased by an addition of 60 new looms which will bring the number up to 400. The plant, which is run under the superintendency of Richard Borner, is operated on worsted serges, fancies and union goods, spinning its own yarns with 10 worsted combs and 10,000 worsted spindles. Thomas Barry is the buyer for the mill at the office 26 N. Front St.

*Virginia, Winchester. The reported increase in the capacity of the Virginia Woolen Co. is to be obtained by running the carding and spinning departments overtime and adding new looms. They now have a total of 60 broad looms. All supplies and equipment for the increase have been purchased.

Mills Starting Up.

Connecticut, Rockville. Application for a receiver for the Rock Mfg. Co. has been denied by the Court and the plant will be reopened in the near future under a restraining order from the Court limiting the authority of the various stockholders.

Maine, Wilton. The Wilton Woolen Co. has resumed manufacturing after a three weeks' shutdown that repairs might be made at the lower mill.

Massachusetts, Quinapoxet. The plant of Cyrus G. Wood & Co. is being started up by C. S. Taylor and M. Bell of Hope Valley, Rhode Island, who leased it some time ago, as reported.

Utah, Provo. The Knight Woolen Mills have resumed manufacturing and are reported to be operating the machinery on flannels. Wm. U. Hanke, formerly of Davenport, Ia., is the new superintendent.

SILK.

New Mills.

*Connecticut, Willimantic. The Willimantic Industrial Co. has awarded contract for building the new silk mill to the F. W. Smith Construction Co. of Pawtucket, who reduced their bid from $49,727 to $48,500. Work will be started just as soon as the weather conditions will permit. The Rossie Velvet Co. of Mystic, which will occupy the building as a branch, has asked that the building be completed as soon as possible, as they would like to have it in operation within a few months.

Pennsylvania, Hudson. The Paterson mill of the Century Throwing Co. is to be moved to Hudson, and work has just been started on a mill which it is expected will be completed about July 1. The equipment of the Paterson mill is 7,000 spindles on which commission throwing is done and all this machinery will be removed to Hudson. It is possible some new equipment will be added, although this matter has not been decided. There is no change in the company as yet on account of this change in the plants. Peter R. Rowson is president, and Alexander McLane, secretary and treasurer. The new mill will be operated by steam power.

*Pennsylvania, Northampton. Machinery is being installed in the plant of the J. H. Mayer Silk Mfg. Co. The company was incorporated late in 1910 with capital stock of $100,000 and will operate 400 looms. John H. Meyer Co., 77 Worth St., New York, controls the concern.

*Pennsylvania, Rockville. A charter has been granted the Peckville Silk Co. with capital stock of $25,000. W. H. and M. K. Kilgour of Scranton and F. A. and S. K. Peck of Peckville, are the incorporators. As noted in earlier reports, a factory building is being constructed in which a silk throwing plant will be located.

*Pennsylvania, York. Construction work is progressing on the new silk mill for E. & H. Levy of New York City, which is being built at the corner of Boundary Ave. and Pine St. The mill will probably be completed before April 1 and as noted previously, some of the machinery from the

New York plants of this concern will be removed to York.

Enlargements and Improvements.

*Connecticut, South Manchester. The roof is on the new three-story mill of Cheney Bros. on which work was begun last August and the heating plant has been installed. The building is 100 ft. wide, and 425 ft. long, of brick construction with concrete foundation. It is to be equipped with special machinery for making spun silk yarns and in the neighborhood of 600 people will be employed in it.

*New Jersey, Paterson. The proposed increase in the plant of Arthur M. Price, 138 Broadway, manufacturer of broad and tie silks, will be made after May 1. Details cannot be given at present as they have not been fully determined.

New Jersey, Paterson. The Newark Silk Co. has added six looms and expects to make a further increase a little later.

New Jersey, Paterson. S. E. Allen, who has operated a throwing plant at 130 Broadway for several years, is building a 1-story mill on 10th Ave., which will contain 5,000 sq. ft. of manufacturing space. When he vacates his present quarters they will be taken over by Arthur M. Price, who will make an increase as noted in another part of this issue.

Pennsylvania, Allentown. The new mill of Hunsicker, Good Co. has been started up, 8 looms being in operation.

Pennsylvania, Easton. Following the purchase of the plant of the Girard Silk Mills Co. by the Roehlen-Pittenger Silk Co., the latter concern has moved into the building, where they have double the equipment, operating a total of 24 looms. The Girard Silk Mills Co. has been dissolved.

Pennsylvania, Emaus. It is probable an addition with capacity of 100 looms will be built to the local plant of D. G. Dery in the near future, as the present plant, which was started up four years ago, has been outgrown.

*Pennsylvania, Williamsport. The 200 new broad silk looms being installed in the plant of J. N. Stearns & Co. are to replace old equipment which is being removed. No further changes are contemplated at this time.

*Pennsylvania, Williamsport. Thos. Morrison & Sons are preparing to remove into their new mill before April 1, when the lease on the present quarters expires. The new building is 125x56 ft., with two wings and has space for 125 looms, although but 60 will be installed at first. Broad dress silks are the product of this concern. The members of the firm are Thos., George and Arthur Morrison. Thos. Morrison attends to the buying.

Pennsylvania, Vera Cruz. The Vera Cruz Silk Co. will shortly begin construction work on an addition, which will double the present capacity of the plant. Broad silks are manufactured. Amandes R. Schuler is treasurer and Geo. Bitzer is buyer.

*Rhode Island, Central Falls. In addition to increasing their weaving capacity, the Leader Weaving Co. will add another silk warping mill and a 100-spindle winding frame. Herbert O. White is president and buyer and C. J. Fillmore is treasurer. The plant is operated by electric power.

Mills Starting Up.

*Pennsylvania, Kane. The Thissen Silk Mfg. Co. has begun manufacturing. This is the new company which purchased the equipment of the Thissen Silk Fabric Co., Fonda, New York, and removed it to Kane.

*Rhode Island, Westerly. The branch mill of the Lehigh Valley Silk Mill of South Bethlehem, located in the Atwood Mill on Main St., has begun operations.

MISCELLANEOUS.

Connecticut, Norwich. Some of the buildings of the United States Finishing Co., of which Norwich will be remodeled and others will be replaced at a cost of about $500,000. The work will be done by employes of the company and be taken up a small part at a time so it will not greatly interfere with the operation of the plant. The office building and the building in which starching, singeing and logwood and aniline dyeing has been done will be removed first. A new office building will then be begun and later a mill 3 stories high, 130 by 158 feet, will be constructed.

*Massachusetts, Worcester. The Wachusett Thread Co. has awarded contract to build the proposed new 4-story mill mentioned in January, to E. K. Watson of Providence, whose bid was $71,499. The mill will be of brick mill construction, with tar and gravel roof.

*New Jersey, Paterson. The new linen thread and yarn mill at Lake View, which has been under construction for some time for J. Edwards Barbour, is nearly completed.

*North Carolina, Burlington. The Burlington Dye Works have moved to the building formerly occupied by the Murbola Hosiery Mill, Inc., and have added $2,000 to the capital stock to provide for an enlargement that is to follow. They dye and finish hosiery for the trade and buy hosiery in the gray on their own account. J. W. Boland and V. C. Price are the proprietors. Mr. Boland attends to the buying. As previously noted, the equipment of the Murbola Hosiery Mill has been taken over by the Midway Improvement Co., and the Murbola Co. will be dissolved.

Pennsylvania, Chester. Architects and builders of Philadelphia have completed plans for two new buildings to be erected for the American Viscose Co., manufacturers of artificial silks, at Marcus Hook, a suburb of Chester. The operation will consist of a one two-story building, 31 by 22 ft., and another building one story high, 56 by 92 ft. Bids are now being asked.

Pennsylvania, Chester. The equipment of the new Chester Converting Co. has been installed and is being operated on winding, quilling and

gassing mercerized yarns for the trade. The capacity is about 10,000 pounds per week. Charles B. Phillips of Philadelphia is president; William H. Thatcher is treasurer, and E. A. Snyder, secretary.

Pennsylvania, Philadelphia. The U. S. Thread Co., which recently succeeded the Upham Bros. Co., located at Lena and Armat Sts., Germantown, where they manufactured sewing cottons, mercerized and glazed yarns, etc., have closed up their plant and state that they will retire from the business. The equipment is for sale.

Pennsylvania, Philadelphia. The John T. Bailey Co., manufacturers of ropes and twines at Morris, Tasker, Delaware Ave. and Water Sts., their plant taking in the entire block bounded by those streets, have recently purchased from the McCahan Sugar Refining Co. the south side of Rasker St. from Delaware Ave. to Water St., measuring 305 by 79 feet, on which they will have erected a large four-story concrete warehouse in which they will store imported raw stock.

Pennsylvania, Philadelphia. F. W. Maurer & Sons Co., Wayne Ave. and Bristol St., manufacturers of tapes on 45 looms, have leased another part of the Dalkeith Mills in which they have installed 20 new looms, bringing their weaving capacity up to 65 in all. They are running full.

Pennsylvania, Philadelphia. The plant recently started at Front and Oxford Sts. by S. Semler & Co., in which they manufactured dress and millinery trimmings, operating 65 braiders, has been taken over by new parties who are now operating it under the name of the Enochs Hermes Braid Co. It is said that the new owners will put in considerable new machinery. The Enoch Hermes Braid Co. was incorporated a few days ago under the laws of New Jersey with capital stock of $100,000 by Frank R. Hansell, John A. MacPeak and William F. Eidel.

*Rhode Island, Niantic. A charter has been granted the Bradford Dyers' Association, Ltd., under the laws of Rhode Island, with authorized capital stock of $1,000,000, to manufacture, dye, bleach, finish and deal in silk, wool and cotton goods and to buy out other plants. The incorporators are David H. Thornton, direct representative in this country of the Bradford Dyers' Association, Ltd., Rufus W. Sprague, Jr., of New York, the Association's attorney, and James H. Hurley of Providence. Mr. Thornton has inspected the property of the Westerly Woolen Co., which has been idle about a year, but declines to state whether this plant will be taken over.

Rhode Island, Pawtucket. A new 3-story building is being built for the Providence Braid Co. in addition to a 25-foot extension on the present plant. These additions are expected to be completed by July and it is hoped that new machinery may be placed early this summer. Recently the capital stock was increased from $50,000 to $150,000. The mill is being operated night and day at the present time, cotton, worsted and silk braids being made on 540 braiders.

*Rhode Island, Warwick. Some of the lace looms in the new Phoenix Lace Mills have been started up and the plant will soon be running night and day, employing two shifts of operatives. The company was incorporated in February, 1910, with capital stock of $275,000, $150,000 paid in. Walter F. Earle, treasurer of the Harvard Trust Co., Cambridge, Mass., is secretary and treasurer, and manufacturing is under the direction of William A. Sowter, who started the Seekonk Lace Co., at Pawtucket. The initial equipment is 12 lace looms.

*Wisconsin, Green Bay. The Willow Grass Rug Co., incorporated a short time ago with capital stock of $100,000, has constructed a mill and begun manufacturing grass rugs, giving employment to 75 hands. A. B. Fontaine is president and buyer; C. F. Van Dycke, treasurer, and C. Kieren, superintendent. The plant is operated by electric power.

FAILURES AND SUSPENSIONS.

North Carolina, Haw River. A voluntary petition in bankruptcy has been filed by the Trolinwood Mfg. Co. 3,000 ring spindles and 144 looms were operated on chambrays. John A. Trolinger is president and buyer; B. S. Robertson, vice-president, and John C. Lloyd, secretary and treasurer.

Pennsylvania, Philadelphia. The Six Mills Co., Inc., with R. F. Shaen as president and agent, manufacturers of men's wear and dress goods with 30 broad looms, located at Howard and Lehigh Ave., are reported as having failed and George Grayson of Darby, Pa., appointed receiver under a bond of $25,000.

Rhode Island, Pawtucket. Stephen J. Casey, an attorney of Providence, has been appointed temporary receiver for the Imperial Silk Mill Co. on petition of Wm. W. Harrison, Francis J. Barry and James F. Barry, who hold 3,000 shares of common stock. Walter Callender, the holder of the preferred stock, did not join in the petition. The mill has been idle for about a month, and it is proposed to wind up the affairs of the company. It is said the assets are about $7,000 and the liabilities from $10,000 to $15,000.

FACTS AND GOSSIP.

California, San Diego. A cotton mill for San Diego is being talked of and promoters say it will be in operation by the time the San Diego & Arizona Railroad is prepared to deliver cotton from the Imperial Valley. There is some talk that it may be a branch of the California Cotton Mills at Oakland.

Canada, Quebec, Montreal. A charter has been granted the Canadian Colored Prints Co. to equip and operate a bleachery and printing plant. The head office is in Montreal. Among the men prominently connected with the concern is W. S. Whitehead, who is a director of the Wabasso Cotton Co., Three Rivers. In all probability the works will be located at St. Timothy, seven miles from Montreal, where an excellent water supply will be derived from the Cascade Rapids.

Connecticut, Vernon. M. H. White, who operated the Vernon Woolen Co. which was destroyed by fire, has located permanently in California, and is raising oranges near Los Angeles.

Connecticut, Willimantic. An old building formerly used as a box shop has been leased by the Rossie Velvet Co. of Mystic, and some velvet machinery will be installed to train operatives. This department will be in charge of Ernest Rossie. A new mill is being built here for the Rossie Velvet Co., as noted.

Georgia, Egan. Within a short time one of the weaving rooms of the Piedmont Cotton Mills will be put on a night and day schedule, having been changed over from towels to bed spreads.

Georgia, Griffin. Committees of stockholders, with W. J. Kincaid as chairman, have been placed in control of the Boyd-Mangham Mfg. Co., Central Mills, Cherokee Mills and the Spalding Cotton Mills. All four companies have been controlled by J. J. Mangham, J. W. Mangham and Douglas Boyd, who have resigned. A meeting of creditors is to be held soon and it is hoped that reorganizations can be effected.

Guatemala, Coban. Enrique Maeschler is about to erect a weaving mill in Coban.

Illinois, Chicago. Mengden & Sons Co. have been granted a charter with capital stock of $12,000 to manufacture and deal in fabrics, yarns and cordage. The incorporators are F. B., H. F. and F. W. Mengden and M. F. Gerton. The concern is located at 165 West Michigan St. and deals in twines and cordage. F. B. Mengden, the president, states that the plans of the company are not sufficiently advanced to allow statement to be made, but during the fall they expect to broaden the business.

Illinois, Chicago. The German Knitting Mills have been incorporated with capital stock of $5,000 to manufacture and sell sweaters and other knit goods. The incorporators are Simon Colman, Max Bernstein and David Bernstein.

Iowa, Davenport. The newspapers of Davenport are agitating the establishment of a cotton mill here.

Maine, Portland. Certificate of the incorporation of the Patent Fibre Cordage Co. has been filed. The corporation has been organized with capital stock of $250,000, of which nothing is paid in, for the manufacture of cordage and twine. Clarence E. Eaton and Albert F. Jones of Portland are the incorporators.

Maine, Winslow. The shoddy mill of Scott Peace which was burned some time ago will not be rebuilt. Mr. Peace is occupying the Brown Mill at Oakland, operating it under the style of the Peace Shoddy Mill.

*Maine, Winthrop. A committee of the Board of Trade has been appointed to confer with John H. McIllroy Son & Co. of North Monmouth, in an effort to secure the location of the proposed new mill in Winthrop.

*Maryland, Baltimore. Nothing authoritative can be learned relative to the cotton mill, which it has been reported is considering the matter of moving to Baltimore. It was reported that a Southern concern, operating about 400 looms, was negotiating with the Merchants & Manufacturers Asssociation for suitable quarters.

Maryland, Baltimore. At the annual meeting of the Consolidated Cotton Duck Co., President Myron C. Taylor stated, relative to improvements, that the building of a large weaving mill is contemplated in which all the weaving in the vicinity of Baltimore will be done. If the proposition is carried out the space now used for weaving in the present mills will be used to increase the spinning capacity. Lockwood, Greene & Co., mill-architects and engineers, Boston, are inspecting all the plants of the company in order to determine what additions and improvements are necessary to improve production and to economize. The management intends to go thoroughly into the systems employed in all the mills, seeking to eliminate waste and to install more economical methods.

Massachusetts, Boston. At a special meeting of the stockholders of the American Woolen Co. to be held April 28, in Jersey City, a proposition will be submitted by directors to reduce the common stock from $30,000,000 to $20,000,000. The American Woolen Co. has been acquiring common shares for some time and now holds 100,000, so the reduction will not disturb the present common shareholders. It is believed that with the reduction in common stock to $20,000,000 dividends of 4 per cent. will be started.

Massachusetts, Boston. An office has been opened at 79 Milk St. by Wm. Sellers & Co., Inc., of Philadelphia, one of the leading manufacturers of power transmission machinery. Chas. F. Underwood is manager. This step has been taken owing to the growth of their business in New England, where they started more than 50 years ago. Facilities have been provided for the prompt handling of inquiries either of an engineering or commercial nature. The transmission business of this company has been a distinct feature in the development of manufacturing industries for many years and they have designed, constructed and erected power transmission machinery for mills and factories of all kinds in all localities.

Massachusetts, Boston. Wm. V. Threlfall Co. announce that they are selling agents for the following well known firms: Potter & Johnson Machine Co., manufacturers of picking machinery, waste openers, thread extractors and revolving flat cards; Woonsocket Machine & Press Co., manufacturers of roving machinery, drawing frames, ball bearing top rolls; Fales & Jenks Machine Co., manufacturers of ring spinning machinery for cotton, ring twisting machinery for cotton, wool and worsted; Easton & Burnham Machine Co., manufacturers of spooling and winding machinery; T. C. Entwistle Co., manufacturers of warpers, ballers, beamers and card grinders. They also furnish mules, combers, gassing machines, cloth trimmers, shafting, pulleys, hangers and power plant equipment. Offices are located in the Marshall Building, Broad, Central and Doane Sts., Boston.

Massachusetts, East Brookfield. The Mann & Stevens Woolen Co. will close No. 1 Mill indefinitely. This mill is leased from Bates & Taylor of Worcester, and it is said locally that the lease expires April 1.

Massachusetts, Franklin. The old plant of the American Felt Co. in Franklin will be discontinued and the local business will be carried on in the plant of the Franklin Felt Co. which the American Felt Co. recently purchased. The American Felt Co. has been granted a charter under the laws of Massachusetts with capital stock of $5,000,000. The original American Felt Co. was chartered under the laws of New Jersey.

Massachusetts, Holyoke. The mill of the Holyoke Warp Co. has been purchased by Patrick J. Judge, who will occupy the two lower floors and rent two upper floors. The warp company will go out of business.

Massachusetts, New Bedford. At the annual meeting of the Nashawena Mills the reported increase in capital stock from $2,500,000 to $3,000,000 was not taken up. It is understood it will be discussed at a future meeting.

Massachusetts, New Bedford. Some of the departments of the New Bedford Cordage Co. are running all night. Manila and sisal cordage and tarred hemp goods are manufactured.

Massachusetts, North Adams. There is a rumor that Wm. Whitman & Co., who recently completed negotiations for the Johnson Mill, adjacent to the Mayflower Worsted Mills which are owned and operated by Wm. Whitman & Co., will combine the two mills under the name of the Hoosac Worsted Co. and install new looms.

Massachusetts, Pittsfield. Watson Stansfield and his brother, John Stansfield, have been in Pittsfield for the purpose of inspecting the idle mill of J. L. & T. D. Peck Mfg. Co. with a view to leasing it. Messrs. Stansfield are connected with the Consolidated Woolen Felt Mills of Amsterdam, which were recently destroyed by fire, and John Stansfield has been credited with the intention of starting a similar plant, but it is not known whether they visited Pittsfield in the interests of the Consolidated Woolen Felt Mills or in the interests of a new business of their own. It is desired only to rent a mill.

Massachusetts, Worcester. The E. D. Thayer Estate interests in the Worcester Woolen Mill Co. have been bought by other stockholders and the concern has been reorganized with John Legg, president; Frank S. Fay, treasurer, and J. Francis Legg, superintendent. There is no change in the management of the business and the corporation will continue manufacturing kerseys, meltons, broadcloth, cassimeres and similar goods. The present stockholders are John Legg, J. F. Legg, Geo. C. Bryant, Norman H. Fay and Frank S. Fay.

*Missouri, Kansas City. The report that a company is in process of organization to build a cotton mill here, the capital stock being placed at $600,000, refers to the preparations that are being made to start up the plant of the Kansas City Cotton Mills Co. Edward E. Holmes, 710-11 Dwight Bldg., has been mentioned as secretary and treasurer of the reorganized company.

New Jersey, Paterson. The assets of Benj. Nathanson, trading as the Washington Silk Mill, have been purchased by the Credential Silk Co. of this city. It is understood the machinery will be operated at 6 Mill St.

New Jersey, Paterson. Emil Fischer, formerly president of the Muller Mfg. Co., contemplates starting a new silk ribbon plant.

*New Jersey, Paterson. Organization has been effected by the Reliable Silk Throwing Co., Inc. Abraham Bornstein is president; Louis Seimons, treasurer, and Israel Herman, superintendent. The new corporation succeeds the partnership of Seimons & Bornstein, who operated 6,500 spindles in the Strange Mill. The capital stock is $21,000.

New York, Cohoes. A charter has been granted the Harmony Mills under the laws of Massachusetts, with capital stock of $3,000,000. This is a reorganization of the Harmony Mills of Cohoes, which was reported in full in January. The spinning department of No. 1 Mill is shut down while new machinery is installed and necessary changes made. This is a part of the extensive improvements noted in connection with an expenditure of about $2,000,000 for improvements.

New York, Cohoes. The Massasoit Wadding Co., recently incorporated with capital stock of $50,000, takes over the business of the same name located in Cohoes, where 19 cards are operated on cotton wadding. S. L. Munson of Albany is president and treasurer and W. B. Cook is superintendent. Both Mr. Munson and Mr. Cook attend to the buying.

*New York, New York. The Liberty Lace & Netting Works, with a capital of $100,000, reported as being in process of organization by Hugo N. Schloss, has equipped a plant at 229th St. and Bronxwood Ave., Williamsbridge, and is now seeking help in different localities for its operation.

New York, New York City. The Rogers, Thompson, Givernaud Co. is settled in the new quarters in the building at the S. E. corner of 4th Ave. and 24th St.

North Carolina, Bessemer City. C. J. Huss, John H. McDonald and John E. Hornbuckle have purchased and will operate the old Vermont Cotton Mills.

North Carolina, Craggy. F. L. Fuller and John F. Wiley, both of Durham, and others, have organized the French Broad Mfg. Co. with capital stock of $250,000. It is reported the concern will finish cotton products.

North Carolina, Mt. Holly. Geo. A. Howell, formerly superintendent of the Chronicle Mills of Belmont, North Carolina, is organizing a company to build a fine yarn mill at Mt. Holly.

*North Carolina, Newell. Although prospects are bright for the success of the cotton mill project, there is nothing definite at present. Developments are expected within a few months. W. B. Newell of Newell & Wallace heads the project.

North Carolina, Stubbs. The property of the Buffalo Mfg. Co. has been sold at receivers' sale by J. C. Smyth, treasurer of the Shelby Cotton Mills of Shelby, to Ambrose H. Cline for $20,000. The plant contains 3,600 ring and 1,720 twisting spindles and good water power.

Pennsylvania, Fullerton. It is reported that a silk mill is to be built here on Quarry St., near Second St.

Pennsylvania, Philadelphia. Pearce & England Co. report operating their Anchor Combing Works, now located in the old Tracy Worsted Mills, at 25th and Spruce Sts., on a day and night schedule. They are assorters, scourers and combers of all kinds of wool on commission with 12 worsted cards and 11 combs and other machinery required for this purpose, their plant being about the most complete of its kind in this vicinity.

Pennsylvania, Philadelphia. The Roosevelt Worsted Mills, 2023 Naudain St., spinners of worsted yarns up to 36s with 5 combs, 5 cards and 500 spindles, have increased their capital to $100,000. Fritz Quittner is the president, general manager and buyer, William Deacon, treasurer and superintendent, and William H. Bartleman, secretary. They sell direct and report a fair business.

Pennsylvania, Philadelphia. The J. R. Bunting Company, now at 532 S. 3d St., where they are manufacturing felt mattresses with 1 garnett, 3 pickers and 1 willow, will in about a month remove to the building recently purchased by them at 16th and Wharton Sts., which was formerly occupied by the Southwark Mills Co. and known as No. 3 Mill.

Pennsylvania, Philadelphia. According to reports the Pollack-Huston Carpet Co. has applied for a charter and on or about April 1 will consolidate the plants of James Pollock & Son at Dauphin and Tulip Sts., containing 75 looms operated on ingrain, damask and Venetian stair carpets and art squares, and Thos. Huston & Co., Trenton Ave. and Dauphin St., in which ingrains are manufactured on 20 looms.

Pennsylvania. Philadelphia. Pollitz, LeFort & Keon, who are manufacturing lace curtains at 1720 N. 5th St., have leased a portion of the building formerly occupied by John Scanlan & Son at 3d and Huntingdon Sts., and are arranging for the removal of their machinery to that location.

Pennsylvania, Philadelphia. Bradbury Bros., owners of the Dalkeith Mills on Bristol St. above Germantown Ave., which contained 100 looms which they operated on cottons and damasks, are now finally out of business as manufacturers. The mills are now used for tenement purposes.

Pennsylvania, Philadelphia. Parties connected with Espen, Stewart & Loeb, 23d and Hamilton Sts., have leased the dye works formerly operated by Bradbury Bros., and are operating it as an experimental plant for treating textile fibers, ramie, etc., under the name of the Imour Mfg Co.

Pennsylvania, Philadelphia. A. Blumenthal, who equipped a plant with 8 looms on Mascher St. above Lehigh Ave., and operated them on men's wear, has removed his equipment to Howard and Palmer Sts., where it is now stored and for sale. He reports that he will not start up again.

Pennsylvania, Philadelphia. The Boston Thread Co. of 107 Greene St., New York, has purchased the equipment of the U. S. Thread Co., formerly Upham Bros. & Co., at Lena and Armat Sts., Germantown. The new owners will continue to operate the plant on sewing cottons, mercerized and glazed yarns, etc., selling the production through their main office in New York and branch office at 252 Franklin St., Chicago.

Pennsylvania, Philadelphia. Eli Titherington & Sons, 79 Wister St., Germantown, are no longer manufacturing upholstery goods; their production now consists of Terry cloths and their 13 looms are running full with as much business on hand as they can handle. They are selling direct.

Pennsylvania, Philadelphia. It has been decided to shut down the plant formerly operated by Wm. Thornton and later operated by his estate on carpet yarns. The machinery will be disposed of and the building will be used in the future for tenement purposes.

Pennsylvania, Philadelphia. John Dunlap & Son, manufacturers of ingrain carpets and axminster rugs on 70 looms, are closing up their affairs and will retire from business. The machinery equipment will be removed to the Toronto Carpet Mfg. Co.'s plant at Toronto, Ontario, they having purchased it.

Pennsylvania, Philadelphia. The Franklin Worsted Mills, 2706 N. Hancock St., are very busy operating 20 broad looms on high-grade plain and fancy worsteds for men's and women's wear which they sell through William Barras, Lippincott Building, 12th and Filbert Sts. J. Turner, who is also engaged in the hair cloth business, is the proprietor. They buy worsted yarns from 24s up.

Pennsylvania, Philadelphia. Samuel S. Fretz, of the S. S. Fretz Mfg. Co. until its failure, has recently purchased a plot of ground at 22d St. and Sedgley Ave. for the sum of $30,000, on which he will have erected a large umbrella factory to cost in the neighborhood of $250,000. It is reported that the company will not make its own fabric.

Pennsylvania, Philadelphia. The Argyle Mills is the name under which John W. Patterson, formerly with the late firm of Sanlin & Sons, is operating 98 looms at 3d and Huntingdon Sts., on cotton and woolen fabrics which he finishes and sells through William J. Richardson & Sons of New York. He is using 4s to 80s cotton, woolen and worsted yarns.

Pennsylvania. Philadelphia. Among the new concerns just started up in this city is the Pigeon Machine Co. This company, which has been working on a new spring needle knitting machine for seamless hosiery, has now completed the machine and will commence building same in their newly equipped plant at Jasper and Orleans Sts., where they have leased a floor in the Lomax Building.

Rhode Island, Lymansville. The capital stock of the Lymansville Co. has been increased from $500,000 to $1,000,000.

Rhode Island, Providence. Rusch & Co., importers of worsteds and velvets, with offices at the corner of Greene and Grand Sts., New York, are the American representatives of the foreign plush and velvet manufacturers who contemplate establishing a branch in Rhode Island or Massachusetts. The company which plans to branch out is a German concern.

Rhode Island, Woonsocket. John J. Mee of Woonsocket, receiver for the American Narrow Fabric Co., has been elected trustee with authority to turn all the assets into cash. Claims amounting to $3,100 were filed against the bankrupt estate.

South Carolina, Charleston. Mr. Hamlin, vice-president of the Sea Island Cotton Growers' Association, is reported to be in communication with a Northern thread manufacturer, who will establish a $250,000 plant in this vicinity, investing about $50,000 himself, provided $200,000 can be raised locally.

South Carolina, Cheraw. A cotton mill may be organized under the style of the Chesterfield Cotton Mills to build a 10,000-spindle cotton mill in Cheraw. D. L. Tilman of this place and J. T. McKinney of Martinsville, Va., are the men interested.

South Carolina, Greenville. At a meeting of the stockholders of the new Parker Cotton Mills, the $10,000,000 merger recently organized, the board of directors and officers were elected. The directors are John Kerr Blanch, of Thomas Blanch & Co., Richmond, Va.; Edwin P. Frost, of Henry W. Frost & Co., Charleston; H. J. Haynesworth, Greenville; R. F. Herrick, of Fish. Richardson, Herrick & Neaves, Boston; Lewis W. Parker, Greenville; Thomas Motley, of Curtis & Sanger, Boston; Thomas F. Parker, Greenville; Edwin W. Robertson, of the National Loan and Exchange Bank, Columbia; R. P. Snelling, of Saco, Pettee Co., Newton Upper Falls, Mass. The officers elected are Lewis W. Parker, president; Thomas F. Parker and M. L. Marchant, vice-presidents; Alex MacBeth, treasurer; M. M. Trotter, Jr., secretary and assistant treasurer.

South Carolina, Greenville. The directors of the Pelzer Mfg. Co. have held a meeting to further plans for their organization and details will be determined soon. The capital stock will probably be $12.000,000, and, as noted previously, the plants to be merged will have a total of 500,000 spindles and 1,500 looms. Ellison A. Smyth of Greenville will be president and John A. Law of Spartanburg and A. F. McKissick of Greenville, vice-presidents. The following companies will be merged by the new corporation: Pelzer Mfg. Co., Pelzer, South Carolina; Belton Mills, Belton, South Carolina; Greenwood Cotton Mills, Greenwood, South Carolina; Ninety-Six Cotton Mills, Greenwood, South Carolina; Watts Mills, Laurens, South Carolina; Riverside Mfg. Co., Anderson, South Carolina; Toxaway Mills, Anderson, South Carolina; Dunean Mills, Greenville, South Carolina; Conastee Mills, Greenville, South Carolina; Issaqueena Mills, Central, South Carolina, and Greenville Mills, Greenville, South Carolina. Headquarters will be in the Masonic Temple at Greenville.

South Carolina, Prosperity. Geo. Y. Hunter, president of the Bank of Prosperity, who heads the cotton mill enterprise, advises that organization has not been completed and he cannot give any definite information as yet.

*South Carolina, Westminster. It is probable an increase will be made in the plant of the Oconee Mills Co. following the recent increase in the capital stock from $300,000 to $550,000. Investigations fail to reveal the nature of the proposed enlargement and the concern declines to make a statement in the matter.

*Tennessee, Chattanooga. There will be no change in the plants of the Bowen-Jewell Co. at Jewell and Chickamauga, Ga., as a result of the incorporation recently reported. They simply have had their charter recorded in Hamilton County, Tenn., in order legally to dispose of some real estate that they had in that county. The cotton mill located at Jewell, Ga., and the Crystal Springs Bleaching Co. at Chickamauga, will take care of all the business that they are engaged in for the present.

Tennessee, Knoxville. Some of the most prominent purchasers of machinery at the recent sale of the plant of the Knoxville Woolen Mill are as follows: A. M. Orr, Piqua, O.; Peerless Woolen Co., Rossville, Ga.; Cleveland Woolen Mills, Cleveland, Tenn.; Uxbridge Worsted Co., Uxbridge, Mass.; Alexander & Garsed, Charlotte, N. C.; John J. Kenyon Mfg. Co., Pawtucket, R. I.; H. S. Rich & Co., Providence, R. I.; Riverside Woolen Mills, Knoxville, Tenn.; Broadway Machinery Co., Cincinnati, O.; Tremont Worsted Co., Methuen, Mass.; Alex Glonwiski Electric Co., Cincinnati, O.; Berlin Aniline Works, New York City; John Burt, Philadelphia, Pa.; Knoxville Cotton Mills, Knoxville, Tenn.; Jefferson Woolen Mills, Jefferson City, Tenn.; Collings-Taylor Co., Cleveland, O.; Melville Woolen Mills, Fredericksburg, Va.; Jeremiah Clark Machinery Co., Lowell, Mass.; Bell Laundry, Knoxville, Tenn.; Putnam Woolen Co., Putnam, Conn.; Sweetwater Woolen Mills, Sweetwater, Tenn.; F. E. Fisher, Louisville, Ky.; Kanawja Woolen Mills, Charlestown, W. Va.; Lacon Woolen Mills, Lacon, Ill.; Old Woolen Mills, Mayfield, Ky. The sale, which was conducted by J. E. Conant & Co., is conceded to have been successful, a total of $148,607.45 being realized.

*Tennessee, Knoxville. L. D. Tyson bought the cotton department of the Knoxville Woolen Mills at the recent sale and it is rumored will operate it under the name of the Tyson or Tryon Mfg. Co. with Ernest Koehla as manager. Mr. Tyson states to the Advance News that he did not buy the cotton machinery for himself only, but for a number of men, and that he and his associates do not know whether they will operate the plant or not. The cotton department of the Knoxville Woolen Mills includes 10,000 spindles on which cotton yarns in chains and on cones and tubes from 8s to 30s were made.

Personals.

Wm. G. Henderson, agent of the Falls and Shetucket Mills, Norwich, Conn., has severed his connection with that company. Mr. Henderson came to the Shetucket Mills fifteen years ago and was afterwards appointed agent of the Falls Co. He has made no plans for the future.

Michael F. Quinn has been appointed overseer of spinning at the Granite Mill, A. L. Sayles & Son, Pascoag, R. I. He comes from the Weybosset Mill, Providence, R. I.

C. Enos Bean has been appointed superintendent of the Drayton Mill, Spartanburg, S. C. He comes from the Majestic Mfg. Co., Belmont, N. C.

Albert L. Mabbett, a graduate of the Lowell Textile School, and for the past year assistant designer at the Beaver Brook Mills, American Woolen Co., Collinsville, Mass., has accepted the position as designer at the Newport Woolen Co., Newport, Me.

R. C. Stallings has accepted the position as overseer of carding at the Glencoe Mills, Columbia, S. C.

E. S. Ward, overseer of beaming and slashing at the Camperdown Mills, Greenville, S. C., has resigned to take charge of spooling, warping, slashing and drawing-in at the Brogon Mills, Anderson, S. C.

C. F. Blum has accepted a position as overseer of spinning at the Glencoe Mills, Columbia. S. C. He comes from the Columbia Duck Mills.

Geo. P. Hall has accepted a position as overseer of winding and twisting at the Glencoe Mills, Columbia, S. C.

Grant Estlow, superintendent of the Patterson Mills, Roanoke Rapids, N. C., has resigned.

Peter M. White, overseer of carding and spinning at the Clayton Cotton Mills, Clayton, N. C., has resigned to accept a similar position with the Liberty Cotton Mills, of the same place.

J. E. Gaddy has been appointed superintendent of the Helen Cotton Mills, formerly the Cawthon Mills, Selma, Ala.

W. E. Fisher, Jr., formerly superintendent and dyer at the Nicetown Dye Works, Philadelphia, who was very successful with the intense black produced at the above plant, has taken full charge of the Standard Hosiery Dyeing & Finishing Works of Philadelphia, where he is producing his high class work for the trade along with up-to-date specialties in hosiery dyeing.

Henry Hamel has accepted the position as boss carder at the Jefferson Mfg. Co., Jefferson, Mass., succeeding Daniel Sheehan.

J. A. Cameron, designer at the Newport Woolen Co., Newport, Me., for the past nine years, has resigned to accept a position as superintendent of the Faribault Woolen Mills Co., Faribault, Minn.

Robert L. Quinley, who recently accepted a position at Hope Valley, R. I., has returned to Stafford Springs, Conn., to accept a position as overseer of carding at the Faulkner Mills.

Fred G. Wilman has accepted the position as overseer of dyeing at the Elm Mills Woolen Co., Tilton, N. H. He comes from Providence, R. I.

Harry Brearly has accepted the position as overseer of weaving at the Assawaga Co., Dayville, Conn. He was formerly employed as second hand at the Assabet Mill, Maynard, Mass.

W. L. Rodgers, president and treasurer of the Nashville Woolen Mills Co., Nashville, Tenn., has resigned. He is succeeded by Leonard Parkes, Jr., who was formerly pay master and secretary of this company.

Henry Jewett and Frank Carr, connected with the R. I. Worsted Co., Stafford Springs, Conn., in the designing department, have severed their connection with this company.

Ernest J. Hill has accepted the position as overseer of carding and spinning at the Marble Knitting Mills Co., Salem, N. Y. He was formerly employed at the Libbey & Dingley Co., Lewiston, Me.

Lincoln Robinson has accepted the position as overseer of carding at the Corr Mfg. Co., Taunton, Mass. He was formerly second hand at the Nemasket Mill, N. E. Cotton Yarn Co., same city.

Thomas Smith has been appointed overseer of dyeing at the Hoosac Worsted Mill, North Adams, Mass. He was formerly employed at the Daniels Worsted Mill, Worcester, Mass.

Wm. A. Evans, overseer of carding in the Parker Mill, No. 1, Fall River, Mass., has resigned to accept a similar position with the Iron Works Mill, No. 6, same city.

Edward Fanning, assistant superintendent of the Granite Mill, A. L. Sayles & Son, Pascoag, R. I., has tendered his resignation to take effect at an early date. Mr. Fanning has not decided upon any plans for the future. He has been connected with this firm for the past 25 years and was considered a very faithful and valuable employe.

John Riley, overseer of weaving at the China Mill, Suncook, N. H., has resigned and was given a banquet and farewell reception at the Osgood Inn by the overseers in the employ of that company. A fine banquet was served and enjoyed by the entire party, consisting of overseers who had been connected with the different mills in Suncook.

J. H. Redmond, designer at the Moosup Mill, American Woolen Co., Moosup, Conn., has severed his connection with that company.

Frank Cuthbertson has been appointed overseer of dyeing at the Continental Worsted Co., Providence, R. I. He formerly held this position.

Geo. F. Payne, superintendent of the Harmony Mill, Cohoes, N. Y., has been appointed general superintendent of the company. Wm. Callan succeeds Mr. Payne as superintendent. Thomas Arm-

strong is superintendent of the weaving department and D. L. Osgood is superintendent of the ring and mule spinning.

Thomas D. Hanley, superintendent and designer at the Daniels Worsted Mill, West Rutland, Mass., has resigned.

Albert Neild of New Bedford, Mass., has accepted a position as superintendent of the U. S. Asbestos Co., Manheim, Pa. He is a brother of John Neild of the Neild Mfg. Co., New Bedford, Mass., and also a brother of James Neild, superintendent of the Nockege Mill, Fitchburg, Mass.

Jos. McCabe, overseer of carding at the No. 1 Harmony Mill, Cohoes, N. Y., has accepted a position as night superintendent of the Oswego Spinning Co., Oswego, N. Y.

Philip McCann, overseer of carding at the Iron Works, Nos. 6 and 7 Mills, Fall River, Mass., has resigned to accept a similar position with the Kilburn Mill, New Bedford, Mass.

Robert A. Smith has been appointed agent af the Shetucket Co. and the Falls Co., Norwich, Conn. He has been assistant superintendent of the Mass Cotton Mill, Lowell, Mass., for the past eight years and is one of the best known mill men in Lowell. His many friends in Lowell regret his departure and are pleased to learn of his success.

C. E. Tucker has been promoted from overseer of carding in the Imperial Mill, Belmont, N. C., to superintendent of the Chronicle Mill, same place.

T. N. Lumley has been appointed superintendent of the Hardin Mfg. Co., of Worth, N. C., succeeding J. R. Young.

R. F. Fisher, overseer of spinning at the Buffalo Mills, Concord, N. C., has resigned to resume his former position as overseer of carding at the McAden Mills, McAdenville, N. C.

Baxter Ledwell has been appointed superintendent of the Belmont Mill, Shelby, N. C., succeeding Wm. I. Woodward, who resigned on account of poor health. Mr. Ledwell comes from Marshall, N. C.

E. L. Lassiter, overseer of carding at the Liberty Cotton Mills, Clayton, N. C., has resigned.

C. L. Bumgardner has been promoted from overseer of spinning to superintendent of the Imperial Cotton Mill, Belmont, N. C.

J. W. Hyde has accepted a position as overseer of carding at the American Spinning Co., Greenville, S. C.

H. E. Kohn, overseer of weaving at the Glenn-Lowry Mfg. Co., Whitmire, S. C., has resigned to accept a similar position with the Banna Mfg. Co., Goldville, S. C.

James Ahmuty, superintendent of the Atlantic Mill, Lawrence, Mass., for the past 9 years, has resigned to accept a position as agent of the Abingdon Mill, Huntsville, Ala.

Robert Hutton, superintendent of the Louisville Woolen Mill, Louisville, Ky., has resigned.

J. A. Perkins has been appointed superintendent of the Atlantic Cotton Mills, Lawrence, Mass. Mr. Perkins resigned the position as superintendent of the Army & Navy Cotton Duck Co., Wilkinsonville, Mass., a short time ago. Previous to that time he held the position as boss weaver at the Naumkeag Steam Cotton Co., of Salem, Mass., and also with the Fitchburg, Mass., Mfg. Company and had worked as second hand and loom fixer in several large mills such as the Pacific Mills, Lawrence, Mass., the Boott Mill, Lowell, Mass., and the St. Croix Cotton Mill, Milltown, N. B., Canada.

Jos. Poulin has accepted a position as overseer of spinning on the night shift at the Wyandotte Worsted Co., Waterville, Me. He was formerly employed as fixer.

N. S. Morgan has been appointed superintendent of the Bakhaus & Kuenzel Co., manufacturers of all wool bed blankets, New Bremen, O. He comes from Detroit, Mich.

David A. Lapraik, overseer of dyeing at the Yantic Woolen Co., Yantic, Conn., has severed his connection with that company.

Edw. Dempsey has accepted the position as overseer of weaving at the Mystic Woolen Co., Hope Valley, R. I. He comes from Wales, Mass., and was formerly employed at Stafford Springs, Conn.

John H. O'Brien, overseer of spinning at the Burlington Mill, Winooski, Vt., has severed his connection with that company.

John Lawton has accepted the position as overseer of dyeing at the Yantic Woolen Co., Yantic, Conn. He was formerly employed at the Akers & Taylor Mfg. Co., Charlton City, Mass.

James Hanlin, overseer of carding at the Faulkner Mill, Stafford Springs, Conn., has severed his connection with that company.

Arthur Hamilton, formerly superintendent of the Parker and Hargraves Mill, Fall River, Mass., and recently superintendent of the Drayton Mill, Spartanburg, S. C., has been appointed general manager of the Lowe Mfg. Co., Huntsville, Ala.

Wm. E. Powers has accepted the position as overseer of spinning at the Somerset Woolen Co., Monson, Mass., succeeding James Bevins.

Theo. Wadsworth has resigned as overseer of weaving at the Globe Mill, Manville Co., Woonsocket, R. I. He is succeeded by E. H. Pierce of the Samoset Mill, Valley Falls, R. I.

Howard R. Whitehead, overseer of carding at the No. 4 Lonsdale Company's mill, Lonsdale, R. I., has resigned. He has held this position for the past six years and is to accept the position as superintendent of the New York Mills, New York Mills, N. Y.

H. E. Whitaker has accepted a position as superintendent of finishing for D. Goff & Sons, Pawtucket, R. I. He was formerly employed at the Brightwood Mfg. Co., No. Andover, Mass.

C. E. Harrison has been appointed superintendent of the Joslin Mfg. Co., Providence, R. I. He

was formerly employed at the Harrison Yarn & Dyeing Co., Pawtucket, R. I.

Frank Stiner, overseer of finishing at the Marston Worsted Co., Skowhegan, Me., has resigned and is succeeded by Albert Sykes of Monson, Mass.

J. T. Patterson, overseer of finishing at the Franklin Mill, Franklin Falls, N. H., has resigned and is succeeded by Oland Cumstock of Lowell, Mass.

James Marshall has accepted the position as designer at the Oneko Mill, New Bedford, Mass. He comes from Oxford, Mass.

Elmer Lovering has accepted the position as overseer of weaving at the Shetucket Co., Norwich, Conn. He comes from Lowell, Mass., and succeeds Wm. D. Crawford.

E. C. Gammage, designer at the Marston Worsted Co., Skowhegan, Me., has severed his connection with that company.

Clarence L. Gardner, who has been overseer of carding at the Bernon Mills, Georgiaville, R. I., for a number of years, has resigned to accept a similar position with the No. 4 Mill of the Lonsdale Co., Lonsdale, R. I.

Fred Deverell, overseer of weaving at the National & Providence Mill, Providence, R. I., has accepted a similar position with the Continental Worsted Co., Providence, R. I., succeeding D. Wardle.

Henry Crompton, instructor in French drawing and spinning at the Lowell Textile School, Lowell, Mass., has accepted a position with the Pacific Mill, Lawrence, Mass.

John Patrick Burke has accepted a position as overseer of dressing at the Continental Worsted Co., Providence, R. I. He was formerly employed as second hand at the Weybosset Mill, American Woolen Co., same city.

Thomas Bradbury, overseer of drawing and spinning at the Wood Worsted Mill, Lawrence, Mass., has severed his connection with that company to accept a position as superintendent at the Merino Mill, South Lawrence, Mass.

Walter H. Angell, overseer of dyeing at the Waucantuck Mill, Uxbridge, Mass., has severed his connection with that company.

James Peeler, for the past six years overseer of carding and spinning at the Dilling Mill, King's Mountain, N. C., has accepted the position of night superintendent of the Belmont Mill, Shelby, N. C.

J. L. Mason has accepted the position as overseer of beaming at the Camperdown Mill, Greenville, S. C.

B. A. Robertson has accepted the position as overseer of carding at the Entwistle Mills, Rockingham, N. C. He comes from the Dresden Mills, Lumberton, N. C.

H. C. Dumas, overseer of weaving at the Stonewall Cotton Mills, Stonewall, Miss., has resigned to accept a similar position with the Helen Cotton Mills, Selma, Ala.

J. P. McCraw, assistant superintendent at the Milfort Mill, Fort Hill, S. C., has resigned to become overseer of weaving, spooling, slashing and drawing-in at the Harmony Grove Mill, Commerce, Ga.

Arthur M. Hamilton has resigned as superintendent of the Dayton Mills, Spartanburg, S. C., to become superintendent of the Lowe Mills, Huntsville, Ala.

Ben Nuttall, overseer of carding at the Lowe Mfg. Co., Huntsville, Ala., has resigned to accept a position as superintendent of the Lawrenceville Mfg. Co., Lawrenceville, Ga.

Oscar Travis, overseer of weaving at the Ivey Mills of Hickory, N. C., has resigned to accept a similar position at the Brookford Mills, same place.

C. E. Orrill has been appointed superintendent of the new Westervelt Mill, Greenville, S. C. He resigned as superintendent of the Otis Mill, Ware, Mass., to accept this position.

Clarence E. Delafield has been appointed district manager of the Crocker-Wheeler Co., Ampere, N. J., with headquarters at their offices in the Boston Safe Deposit and Trust Bldg., 201 Devonshire St., Boston, Mass.

Timothy Hickey has been appointed second hand in the carding department at the No. 2 mill of the Samoset Co., Valley Falls, R. I. He comes from the Fletcher Mill, Providence, R. I.

John Ryan has been appointed overseer of carding at the No. 1 and 2 mill of the Samoset Co., Valley Falls, R. I.

Oscar K. Dietrich, assistant superintendent and designer at the Marston Worsted Co., Skowhegan, Me., for the past three years, has severed his connection with that company.

Henry W. Templeton has accepted the position as overseer of finishing at the Provo Woolen Co., Provo, Utah. He was formerly employed at Shelton, Conn.

Percy Smith, overseer of finishing, and Jesse R. Smith, his assistant, at D. Goff & Sons Mill, Pawtucket, R. I., have severed their connection with this company. They have been in their employ for the past seven years.

John Bradshaw, overseer of spooling and warping at the Forestdale Mfg. Co., Forestdale, R. I., has resigned his position at that mill.

William Thorpe, overseer of spinning at the Reliance Worsted Co., Norwich, Conn., for a number of years, has severed his connection with that company.

Thomas Richmond has accepted the position as overseer of carding at the No. 2 Mill of the Putnam Woolen Co., Putnam, Conn.

Walter Rigby has been appointed superintend-

ent of the Bibb Mfg. Co., Columbus, Ga. He comes from New Bedford, Mass.

Prof. W. F. Schaphorst of the Mechanical Engineering Department of the New Mexico College of Mechanic Arts has resigned his position there to become a technical writer on the staff of A. Eugene Michel, Advertising Engineer, New York City.

Harry McClintock has accepted the position as overseer of dyeing at the Waucantuck Mill, Uxbridge, Mass. He formerly held the position as boss dyer at the Saranac Mill, Blackstone, Mass.

Henry A. Francis has been elected president of the Pontoosuc Woolen Mfg. Co., Pittsfield, Mass., to succeed David Campbell. Mr. Campbell will hold the office of vice-president.

Edward Elsner, formerly designer at the Wyandotte Worsted Co., Waterville, Me., has accepted a similar position with C. Bahnsen & Co., New York City, selling agents for the Wyandotte Worsted Co. of Waterville.

Alec Linton has been appointed overseer of dyeing at the Beaver Brook Mill, Collinsville, Mass., succeeding Jno. Kaye.

George H. Snow has been appointed superintendent of the Home Mill, Fabyan Woolen Co., Staffordville, Conn.

Jno. Miller has accepted the position as overseer of dyeing at the Woolen Mfg. Co., Beaver Dam, Wis. He comes from Racine, Wis.

H. M. Buskey has accepted the position as overseer of carding at the Orswell Mill, Fitchburg, Mass. He comes from Thorndike, Mass.

Samuel McIntire, overseer of carding at the Beaver Brook Mill, American Woolen Co., Collinsville, Mass., has severed his connection with that company.

R. A. Waddle, overseer of weaving at Willetts, Ltd., Richelieu Woolen Mills, Chambly Canton, P. Q., Canada, has resigned.

John R. Butterworth, superintendent and general manager of the Clyde Print Works, Riverpoint, R. I., has tendered his resignation.

Frank J. Dowd, Sr., has accepted a position as overseer of weaving at the Dustin Island Woolen Co., Penacook, N. H. He was formerly employed at the Concord Mfg. Co., same town, and succeeds Lawrence Love.

Ephraim E. Orrell, superintendent of the Otis Co., Ware, Mass., for the past 15 years, has severed his connection with that company.

Arthur G. Walsh, overseer of the cloth department at the Acushnet Mill, New Bedford, Mass., died at his home on Grinnell St., Sunday, March 19. He was 45 years of age and is survived by a widow and three children.

Matthew Conlan, overseer of carding at the Dartmouth Mill, New Bedford, Mass., has severed his connection with that company.

William Lee, an overseer at the Farr Alpaca Co., Holyoke, Mass., has severed his connection with that company.

F. I. Henry has been appointed overseer of carding and spinning at the Thorndike Co., Thorndike, Mass.

W. E. McSwain, from Bessemer City, N. C., has accepted the position of overseer of spinning at the Neeley Mfg. Co., Yorkville, S. C.

John E. Hornbuckle has accepted the position as assistant superintendent at the Vermont Mill, Bessemer City, N. C. He comes from Burlington, N. C.

Henry E. Erwin has been promoted to the position of superintendent of the Green River Mfg. Co., Tuxedo, N. C.

John H. McDowell, superintendent of the Huss Mfg. Co., Bessemer City, N. C., will also be superintendent of the Vermont Mill, same place.

A. I. Mitchell, manager of the Warren Woolen Co., Stafford Springs, Conn., and Mrs. Mitchell sailed Wednesday, March 15, for Bermuda. They will be gone several weeks on account of the illness of Mr. Mitchell.

John G. Taylor, one of the oldest inmates of the Masonic Home, Philadelphia, died of apoplexy. He was born in England, March 17, 1823, and came to Philadelphia when a young man, engaging in the manufacture of textile yarns in the Kensington district. He was a member of the Hamilton Lodge, No. 504, Freeman Royal Arch Chapter, No. 243, of the Masonic Fraternity.

Jefferson B. Kimball has accepted the position as designer at the Daniels Worsted Co., Worcester, Mass. He comes from the Stillwater Worsted Co., Greenville, R. I.

Geo. W. Merrow has been appointed overseer of carding at the Royal Linen Mill, Mystic, Conn.

C. S. Lord has accepted the position as overseer of the finishing department at the Verd Mont Mill, Ludlow, Vt. He comes from Bridgton, Me.

A. A. Dobbrow has accepted the position as overseer of weaving for the Warrenton Woolen Co., Torrington, Conn. He was formerly employed at the Reliance Worsted Co., Norwich, Conn.

Henry L. Stewart has been appointed overseer of finishing at the Glen Worsted Mill, Elmville, Conn. He was formerly employed at the Narragansett Worsted Mill, North Oxford, Mass.

L. L. Wilson has accepted the position as superintendent of the Holston Mfg. Co., Lenoir City, Tenn., succeeding G. W. Sheeley.

Chas. Killmar has accepted the position as overseer of knitting for the Fonda Glove Lining Co., of Fonda, N. Y. He comes from Germantown, Phila., Pa.

C. B. Atkins has been appointed superintendent of the Eagle Knitting Mill, Milwaukee, Wis. He was formerly employed at Cleveland, O.

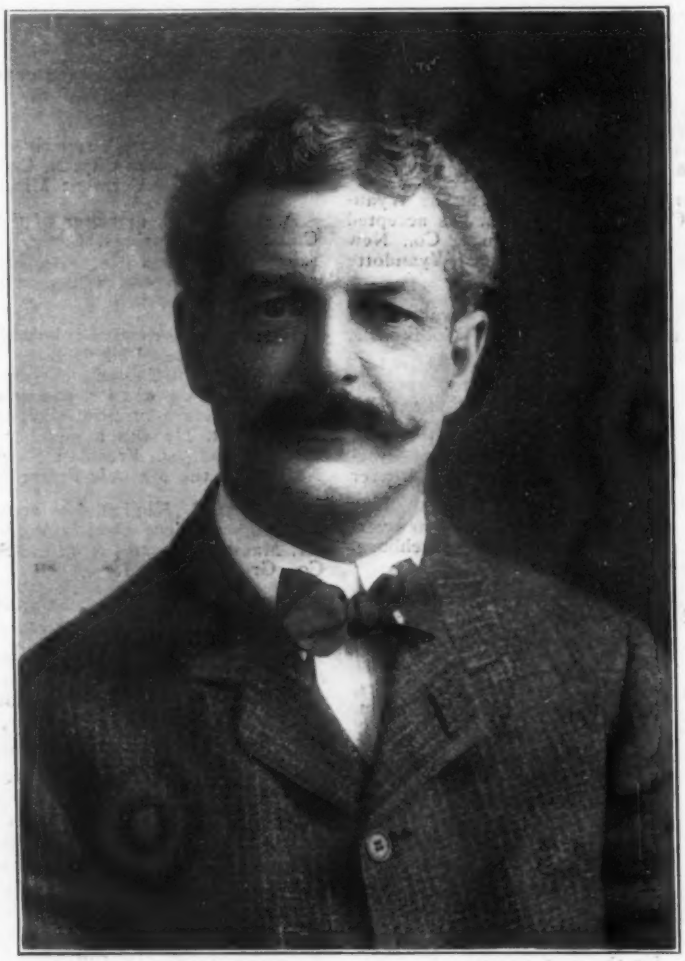
Frank Robinson has accepted the position as overseer of spinning at the Oneita Knitting Co., Utica, N. Y. He was formerly employed at the Eagle Spinning Mill, Hamilton, Ont., Canada.

W. S. Rand, superintendent of the Clare Knitting Mills, Saginaw, Mich., has severed his connection with that company.

William T. Swain, overseer of knitting at the Fonda Glove Lining Co., Fonda, N. Y., for the past four years, has severed his connection with that company.

DEATHS.

Haven C. Perham, treasurer of the Lowell Machine Shop and the Kitson Machine Shop of Lowell, Mass., died early Monday morning, March 27th, at his home, as a result of pneumonia. His death will come as a shock to a very wide circle



THE LATE HAVEN C. PERHAM.

of friends and business acquaintances, as his illness was of short duration. Few men in cotton manufacturing circles were better known and more highly thought of. Lowell has certainly lost one of its most prominent and respected citizens. Mr. Perham was born in 1851 at Tynsboro, a nearby town, where his ancestors had lived ever since the early settlement of the country. He was educated as a boy in the Lowell public schools and graduated from the high school in 1868. He first went to work for Jacob Rogers in the hardware

Frank Payton has been appointed superintendent of the Fay Stocking Co., Elyria, O., succeeding Bert L. Brown.

James H. Dushame has been appointed assistant overseer of finishing for D. Goff & Sons, Pawtucket, R. I. He was formerly employed at the Salt's Textile Mfg. Co., Norwalk, Conn.

Oscar Kennett has been promoted to overseer of spinning at the Hanes Knitting Co., Winston, N. C.

and mill supply business and by successive advancement finally became head of this concern. Mr. Rogers, who was largely interested in the Kitson Machine Shop, asked him to take its management, which he did, and soon became treasurer. He held that position to the time of his death. Some years ago when the controlling interests of the Kitson and Lowell Machine Shops were merged, Mr. Perham was elected treasurer of the Lowell Machine Shop as well and continued to be active head of both concerns with remarkable success. He combined to an unusual degree executive ability and tact in the management of men and large affairs, as well as unusual ability as a salesman and negotiator of large undertakings. Although not a practical machinist he thoroughly understood cotton machinery. A number of improvements introduced by the Kitson Machine Shop were of his suggestion.

Mr. Perham was widely known among cotton manufacturers of the country and was a regular attendant at the cotton manufacturers conventions at which he will be greatly missed. As a mark of respect to his memory the Lowell Textile School was closed on the day of his funeral and during the services both the Lowell and Kitson Shops and the Union Bank, of which he was a director, were closed. A widow and son survive him.

Ambrose J. Nichols, prominent in the textile business of New Hampshire and at one time agent of the New Market Mfg. Co., New Market, N. H., died suddenly March 19 at his home in Providence at the age of 77 years. He retired from active business about eight years ago. He was born in Coventry, R. I., March 13, 1834. Besides three children Mr. Nichols is survived by a widow.

Thomas J. O'Malley, for several years in charge of finishing for the Wanskuck Co., Providence, R. I., died suddenly at his home, 515 Douglas Ave., of pneumonia. He was 49 years of age, married and highly respected by all who knew him.

C. A. Rossie, president of the Rossie Velvet Co., Mystic, Conn., died at his home in Germany recently.

J. W. Hawke, secretary and treasurer of the Coosa Mfg. Co., Piedmont, Ala., died suddenly on Monday, March 6, while in Anniston, Ala., of heart failure. Mr. Hawke was 58 years of age and was prominently identified with many business enterprises. He had been associated with the Coosa Mfg. Co. practically since it was incorporated in 1891, and had also been one of the organizers of the Ide Cotton Mill, Jacksonville, Ala., of which he was for many years the vice-president.

Joshua Adams, president of the Knox Woolen Co., and also president of the Megunticook National Bank of Camden, Me., died at his home at the age of 83 years.

Moses W. Lipper, a retired manufacturer, died at Aiken, S. C. He was born in Germany 75 years ago and came to this country at the age of 16 years. A few years afterwards he engaged in the manufacture of braid and dress trimmings. He is survived by a widow.

A. Park Hammond, treasurer of the N. E. Co., Rockville, Conn., and well known as a woolen manufacturer, died March 18 and was buried from his home in Rockville, March 21. During the funeral services the machinery in all mills operated by the Hockanum Mills Co., Minterburn, New England and Springville was stopped. The Rockville banks were closed, as he was president of the Rockville National Bank for years.

Loring W. Downs, for a number of years in charge of the carding and spinning for the Amoskeag Mfg. Co. at their Langdon Mill, died at his home in Manchester, N. H., Feb. 27. Mr. Down's death was wholly unexpected. He had been in his usual health and had returned home after attending to some business in the city. He was 58 years of age and was born in Somersworth, N. H. He is survived by a wife, two brothers and one sister.

Cornelius Harrigan, treasurer of the Merion Worsted Mill, West Conshohocken, Pa., died Feb. 28, at the age of 60 years. He was well known among the textile mills in Pennsylvania and New York State, and his many friends will grieve to hear of his death.

Samuel E. White died March 3 at his home in Lancaster, S. C., at the age of 75 years. He was president of the Forest Mills Mfg. Co., Forest Mills, S. C., one of the first gingham mills established in the South. He was widely known throughout the textile trade.

Michael Mullaney died at his home in New Bedford, Mass., March 1. He resigned as superintendent of the Androscoggin Mill, Lewiston, Me., about two years ago. He was 69 years of age and had worked in several mills in Fall River and New Bedford before taking the position as superintendent of the Androscoggin Mill. He is survived by one son who is an overseer at the Bennett Mill, New Bedford, and two daughters.

Berthold Galland, knit goods manufacturer, died March 2 at his apartment on Broadway, New York City. Mr. Galland was born in Germany 67 years ago and came to this country when a young man. He went to Scranton, Pa., where he learned the knitting business and built a large factory there.

J. W. Hawke, treasurer and agent of the Coosa Mfg. Co., Piedmont, Ala., died suddenly at Anniston, Ala. He was 58 years of age and had been connected with the Coosa Mfg. Co. ever since its incorporation in 1891. He leaves a widow, three daughters and one son.

S. A. Emery, president of the Woodside Woolen Co., Northboro, Mass., died very suddenly at his home in Northboro, March 10. He was 50 years of age and had been a resident of Northboro for a great many years.

John W. Blackwood, formerly superintendent of the Union Mfg. Co., Peterboro, N. H., died at the Worcester Hospital, Worcester, Mass., at the age of 46 years. Several years ago he was superintendent of the Clarendon Mill, West Boylston, Mass.

Frank Dupee, well known in the wool trade and a wool merchant of Boston, Mass., died at his home March 9 of heart disease.

New Publications.

[Any work noticed under this head can be obtained through the office of this journal.]

Practical Cotton Finishing, by J. Harold Edge, F.C.S.; 103 pages, 5 by 8; The Trade Papers Publishing Co., Ltd., London, W. C.; price, $1.25.

This book is intended particularly for the use of the mill man. It begins with a short history of finishing and this is followed by chapters on the following subjects: A Short History of Finishing, Water in the Finishing Works, Softeners and Conditioners, Starches and Fillings, Antiseptics, Blues and Blueing, Typical Mixings and Finishes, Flame-Proofing Cottons; Examining Finished Goods, Systematic Analysis of Finishing Material in Cloth; A Dictionary of Finishing Materials, Finishing Machinery. There are a number of illustrations of machines used in finishing. The work cannot fail to be a useful handbook in finishing works.

The Southern Textile Bulletin; The Clark Publishing Co., Charlotte, N. C.

This new weekly journal made its appearance in March under the editorship and management of David Clark, who had been for some time past editor of the Textile Manufacturer of Charlotte. Mr. Clark is a Southerner of wide acquaintance among the manufacturers and mill men and his experience in Southern journalism should enable him to produce a publication that will interest the mill men of the South. The Bulletin will make a special feature of personal news and the publication will be devoted strictly to Southern mill interests.

We extend our best wishes to our new contemporary.

Decimal Yarn Table for Cotton; The Manchester Chamber of Commerce, Manchester, England.

This table is printed on a card 10 by 12 inches. The directions for the use of the table appear on the back. The table is based on 120 yards and opposite the weight in grains is given the count of the yarn. In addition to the directions for the use of the table there is an explanation of the calculations to determine the conditioned weight of textile materials, and also a number of useful textile calculations.

The Textile Industries, by William S. Murphy, assisted by leading experts in textile technology; vol. 6, 200 pages, 6½ by 10; Gresham Publishing Co., 34 Southampton St., Strand, London, England. Price per volume, $3.00.

Volume 6 of this work has recently been issued and contains parts 5 and 6. The fifth part deals with textile weaving and designing, and the sixth with carpet manufacture. Following is an abstract of the table of contents: Plain Cloth Design, Twilling, Rearranged Twills and Checks, Drafting, Figure Weaving, Gauze Patterns, Plush and Velvet, Double Cloths; Varieties of Carpets, Oriental and Axminster Carpets, Machine-made Tifted Carpets, Brussels and Wilton Carpets. The text and illustrations of this volume are kept up to the high standing of the preceding volumes.

The Story of the Evolution of the Spinning Machine, by B. Palin Dobson, A.M.I., Mech.E.; 124 pages, 5¼ by 8½; Marsden & Co., Ltd., Manchester, England.

The textile worker, the mechanic, the student and the general reader will always find the development of cotton machinery of absorbing interest, and Mr. Barlow, of the firm of Dobson & Barlow, Bolton, England, has been especially successful in telling this story in the volume before us. He begins with the evolution of the gin, following this with chapters on blowing roof machinery, the carding engine, the spinning machine and the mule, closing with chapters on the evolution of the factory system and of the modern system of textile machine works.

New England, by George French; 431 pages, 5½ by 8; The Boston Chamber of Commerce, Boston, Mass.

The publication of this book is part of the work now being done by the Boston Chamber of Commerce to promote the industrial and commercial interests of New England. The author deals with the subject under the following heads: The Charm of New England, Manufacturing in New England, New England Waterpowers, New England Agriculture, Soils of New England, Forestry in New England, New England Workmen, The Industrial Boston, Boston, Transportation, Good Roads in New England, New England Summer Resorts, Education in New England, Commission Government, Potential New England. There are many excellent illustrations.

Business Literature.

The Climax Machine Co., Philadelphia.

An illustrated catalogue showing the line of machinery, both of American and English manufacture, which they handle. They have the agency for some well-known German machines of flat knitting type. The catalogue shows also illustrations of circular sweater machines, color automatic stripers, crochet machines, gas mantel machines, ribbers, stop motions, as well as the Climax attachments.

Friction Clutches; The Carlyle, Johnson Machine Co., Manchester, Conn.

A 35-page pamphlet describing and illustrating the Johnson friction clutch. This clutch embodies all the principles which make a perfect friction clutch. It is small, powerful, simple, neat, and operates easily and quietly. It is made both double and single. This pamphlet also includes price list of clutches and clutch parts.

Polyphase Induction Motors; The Crocker-Wheeler Co., Ampere, N. J.

Improved operating conditions and increased efficiency have been brought about in widely different industries through the introduction of the polyphase induction motor. Its extreme simplicity of construction makes it practically "fool proof" and the possibility of using it in connection with a high tension transmission system has contributed materially in reducing the cost of delivered power.

In textile mills, woodworking plants and other places when a small spark may easily cause an explosion or dangerous conflagration, squirrel cage induction motors may be used with perfect safety, as their construction involves no sliding contacts.

There are, however, many characteristics inherent in induction motors that are not found in any other machine in the market and that must be taken into account in applying the motors to industrial apparatus. On the proper consideration of these features depends the success of the application. The discussion of induction motor design presented in a pamphlet (Bulletin 126) recently issued by the Crocker-Wheeler Co. of Ampere, N. J., is therefore of interest to every person in any way interested in the application of motor drive to industrial machinery. It is handsomely illustrated throughout with half-tone engravings which show many interesting applications as well as presenting the details of construction of the machines themselves.

The Regulation of Moisture in Textile Mills; John W. Fries, Winston-Salem, N. C.

This attractive 20-page pamphlet contains an illustrated description of the Hygrosso humidifier, which is manufactured by John W. Fries, Winston-Salem, N. C. The importance of air moistening in textile mills is no longer disputed. It is generally recognized that the regulation of moisture in the atmosphere is necessary in order to do good work and maintain the production at the required standard. The question now is what humidifier shall be used and this pamphlet has been prepared as an answer in behalf of Hygrosso. A copy will be mailed on application.

Roof Construction Diagram; The Barrett Manufacturing Co., New York.

This diagram, which is on a card 10½ inches square, shows approximately the increased cost of constructing steep roofs as against those with flat surfaces. It also shows the rise or pitch of roofs in inches and degrees. On the back of the card is given in full the Barrett specifications for felt, pitch and gravel or slag roofing.

Should Terms of Payment Be Enforced? by W. L. Brownell, Treas., Crocker Wheeler Co., Ampere, N. J., published by the National Association of Credit Men.

This pamphlet contains a copy of an address by Mr. Brownell before the National Association of Credit Men. It has attracted much attention and in this pamphlet form will be appreciated by the credit men of commercial and manufacturing concerns.

Better Than Daylight, the Cooper-Hewitt Lamp; Cooper-Hewitt Electric Co., Hoboken, N. J.

A 16-page pamphlet showing the value of the Cooper-Hewitt lamp for textile mills.

Reduction in Price of Link Belt.

The Link Belt Co., of Chicago and Philadelphia, announce a reduction in price of the Ewart belt, details of which may be had on application The quality of the product will be maintained as usual.

A Useful Machine.

A machine that is proving itself a time and money saver in the mills is the Adjustable Rod and Dowel Machine, made by W. S. Hawker Mfg. Co., Dayton, Ohio.

The chief advantage of this machine is that mills can make their own rods or small rolls when needed, without waiting for them. This machine costs nothing for operation excepting when in actual use, and it can easily be set to run by belt from any shaft line. It is in use only when saving money for the mill.

The use to which the machine is being put in some mills are many and varied, including the turning of lease rods, skewers, scavenger rolls, dowels, rolls and poles for stock dye tubs, curtain rolls, etc. The manufacturers claim that this machine doubles the capacity of any solid chuck machine. It turns hard or soft wood equally well, and machines are built to turn pieces varying from ¼ in. to 6 in. in diameter.

An interesting feature in connection with this machine is the selling policy of the company, through which it undertakes to prove to prospective purchasers in their own plants that the machine will save money for them, before the sale takes place. This machine is doing satisfactory work in some of the largest mills in the country.

The Wm. Firth Co. Takes New Agency.

Messrs. William Firth Co., John Hancock Bldg., 200 Devonshire St., Boston, Mass., have been appointed American agents for Sir James Farmer & Sons, Ltd., Adelphi Iron Works, Salford, Manchester, England, builders of machinery for bleachers, dyers, calico printers and finishers. The reputation of this concern is world-wide and their machinery is in use in all manufacturing countries. The William Firth Co. will be pleased to quote prices on any machines in this line.

Lecture Before Loomfixer's Class.

Principal W. H. Dooley of the Lawrence Industrial School has made arrangements to have experts from the different loom works speak at different times during the year before the loomfixers' class.

The first lecture was delivered on March 30, at the Battery Building, by Henry Stafford of the Draper Loom Works.

While the evening school has closed it is believed monthly talks before the loomfixers will bring before them the latest development in looms and methods of weaving.

Congress of Applied Chemistry.

A preliminary announcement of the Eighth Annual Congress of Applied Chemistry, to be held at Washington, D. C., September 4, 1912, has recently been issued. It contains a copy of the constitution and by-laws, rules for the conduct of the congress and preparation of papers, a list of the officers and members of various committees, also of the official representatives and individual members. The officers and committees of the different sub-sections are also given.

The Lowell Felt Company.

The Lowell Felt Co. began on April 3, most of the machinery having been already installed in the plant of the new company. One hundred hands will be employed at the start. The new company is organized under the laws of Massachusetts and is beginning operations here for the first time. Its officers are W. D. Smith, president; A. C. Smith, secretary; Dwight Smith, treasurer, and Erving R. Libby, superintendent. It will manufacture comb buffers and wool wadding, felt polishing and buffing wheels for metals, marble, glass, wood finishing and general mechanical purposes, saddle pads, horse boots and oil boxes.

All the machinery installed is new and especially designed by the company for the purpose of manufacturing the highest grade of felting, wool wading, buffing and polishing wheels that it is possible to make. The treasurer, Dwight Smith, has had experience in the wool trade as a manufacturer of wool felts, while the superintendent, Mr. Libby, who comes here from the felting company at Milbury, Mass., was for many years in charge of the Bacon Felting Co. of Winchester, Mass., and has had over twenty years' practical experience in the business. Mr. Libby has designed some of the machinery to be used.

The company has taken what formerly was the storehouse and machine shop of the Middlesex Mfg. Co. The buildings face on Warren St. just below the counting room, but the company has options in other parts of the plant which it intends to use as the business increases.

Silk City Warping Company.

The importance of well-made warps on the production of the mill and on the quantity of the goods is generally recognized and in no branch of the textile business is it more important to have the warps well made than in silk manufacturing. The Silk City Warping Co., 52 Greene St., New York, make a specialty of preparing silk warps for the looms and have equipped their plant with the most improved machinery for doing this work. Their warpers are built so as to prevent section marks due to inaccurate spacing, and are also equipped with special attachments for preventing the silk from being torn or chafed by the warper reeds. They invite manufacturers to communicate with them regarding the preparation of their warps.

Softening Oil.

Soluble softening oil, manufactured by the Arabol Mfg. Co., 100 William St., New York City, is a very effective softening and sizing oil. Manufacturers like it because it is easy to handle, is always reliable and is not influenced by temperature. It gives a smooth finish to the warps, the threads divide well in the lease rods, and the cylinders of the slasher remain clean. It is neutral and especially suitable for strong and closely woven goods, such as corduroys, velveteens, sateens, twills, umbrella cloth, cambric warp, etc.

How to Remedy Dusty Concrete Floors.

In a recent discussion on the question of dustless concrete floors, L. C. Wason of the Aberthaw Construction Co., Boston, Mass., gave two methods which had proved satisfactory for stopping the dusting of floors already built. The first was to apply a coating of boiled linseed oil and the second, a coating of water glass or sodium silicat. In the course of his discussion he stated that as a rule there was entirely too much working on the surface material in laying concrete floors. As natural stone is much harder than concrete it will resist abrasion much better and therefore the larger percentage of natural stone which can be brought to the surface in laying concrete floors the less will be the dusting. The more the trowelling the more will the smaller particles be worked toward the surface. Furthermore, the last of the successive trowellings which are common is apt to take place after the concrete has taken its initial set and therefore tends to reduce the strength.

It was also stated that if the finished floor was laid with the underflooring in one operation that the top layer could be considerably thinner than if it is applied after the underflooring has set. In the latter case, great care should be taken to effect as perfect a bond as possible between the underflooring and finished surface, and it is also advisable to make the top layer of sufficient thickness so that light reinforcing could be introduced in same.

Buffalo Fans.

A big order for fans was recently placed with the Buffalo Forge Co., Buffalo, N. Y., by the New Jersey Zinc Co., after a careful test to determine the relative efficiency under identical conditions. These Buffalo fans showed a saving in power consumption of about 30 per cent. over the old installation. The order calls for 54 of these large special fans, which will make over eight carloads.

The Value of a Name.

We have been consistent advocates of the "Trade Name" or "Trade Mark" and urge their adoption wherever the business relations between manufacturers and selling forces permit; but its value depends upon the merit of the goods on which it is placed and the enterprise of the man or concern back of the goods.

The public is trained, and generally believes, that goods having a name are better, will wear or give satisfaction better than unmarked goods. The method or medium which suits the one line may be wholly unsuited to the other, but the underlying principle remains the same. The ultra-conservative and sceptical occasionally take a little plunge, and frequently lose because done inadvisedly or spasmodically. Advertising, no matter how or by what method, must be done continuously and of a nature and in a style to inspire confidence.

The textile and particularly the hosiery and knitting advertisers in our leading weeklies and

magazines are seen in the constantly increasing numbers, all bespeaking an awakening which is a guarantee of prosperity.

Two Big Knitting Machine Builders Join Forces.

An official announcement has recently been made which gives details of the merger of two of the most prominent builders of knitting machinery, viz., Scott & Williams, Inc., of Philadelphia and Boston, and the Geo. D. Mayo Machine Company, of Laconia, N. H. Large interests in each company acquire interests in the other. The identity of each concern is to be maintained and each plane will be operated separately, but through the concentration of management and selling agency large economics will be effected, as the selling organization will handle the entire line both of the Scott & Williams and Mayo concerns.

Philip M. Raynolds, treasurer and general manager of Scott & Williams, Inc., will hold the same offices in the George D. Mayo Machine Company, succeeding H. W. Daniell as treasurer of the latter firm. Frank E. Mellor will be general superintendent in charge of both plants. Harry Swinglehurst, who was formerly superintendent of the Scott & Williams plant, has for some months been located at the general offices in Boston, and will be closely associated with the enlarged business. George D. Mayo will continue to be identified with the Laconia business, alt' ough relinquishing much detail work, and will also become a director of Scott & Williams, Inc.

The financial, general management and sales department of both companies will be conducted by Treasurer and General Manager Philip M. Reynolds, with headquarters at 201 Devonshire street, Boston. The Philadelphia and other local offices of the George D. Mayo Machine Company will be continued as heretofore and no changes among the present representatives are contemplated.

The machinery built by these two concerns is non-competitive, each supplementing the other, so that their selling agents are now in a position to satisfy a call for everything desired in the line of crcular knitting machinery. Both concerns are in the front rank and their machines are in extended use among the trade.

The Cotton Yarn Salesmen's Association.

This association held its annual banquet and entertainment at the Hotel Walton, Philadelphia, on March 25. In the absence of President Bieg, C. Taylor Rue acted as toastmaster. There was a record attendance, many new members being present. After the speeches there was an entrtainment. Plans are being made for an outing to be held this summer.

Link-Belt Company Changes Boston Office.

The increasing demand for "Link-Belt" elevating, conveying and power transmission machinery and chains has necessitated the removal of the Link-Belt Co.'s Boston sales office from 84 State St. to more commodious quarters at 131 State St., Boston, Mass. Mr. Lawrence Spillan is in charge.

Rose Label Stitching Machine.

Lawrence M. Stein Co., 237 Market St., Chicago, who are agents for a number of sewing machines and specialties for knit goods manufacturers, have secured the agency for the Rose label stitching machine for the Middle West.

Southern New England Textile Club's March Meeting.

The March meeting of the Southern New England Textile Club, which was held at the Narragansett Hotel, Providence, R. I., Saturday afternoon, March 18th, will long be remembered as a most interesting as well as enthusiastic gathering, nearly two hundred members and guests being present. The members began to arrive about noon and from that time until two o'clock the lobby of the hotel was alive with cotton manufacturers and men of kindred interests.

The absence of formality and spirit of congenial and healthy comradeship (for which this club was created) is responsible for the rapid growth of this institution.

The dinner was held in the large dining room of the hotel and the members, with the exception of those at the head table, were grouped around in small numbers, which helped to make it even more enjoyable and sociable. President Dimmick presided with his usual graciousness, on both sides of him being the members of the executive committee and the invited guests. Ex-Governor Eben S. Draper of Massachusetts was the guest of honor and the principal speaker.

Other prominent guests were Walter E. Parker of the Pacific Mills, Lawrence; Stephen M. Bourne of the Dundee Mills, Hookset, N. H., formerly agent for the Stark Mills of Manchester, N. H.; Capt. Charles H. Manning of the Amoskeag Mfg. Co., Manchester, N. H.; E. W. Atkinson of the firm of Richards, Atkinson & Haserick. Letters of regret were read from Charles H. Hutchins, president of the Crompton & Knowles Loom Works; George M. Whitin, treasurer of the Whitinsville Machine Co., Whitinsville, Mass.; Charles E. Riley, treasurer of the Howard & Bullough American Machine Co. of Pawtucket, R. I.

Ex-Governor Draper, being introduced, received an ovation which should have proven to him conclusively that he was among friends. His talk was entirely of an informal character, but most interesting. He spoke of the advanced conditions of the cotton manufacturing industry and made his comparisons with textile manufacturing in New England thirty years ago at the time he started his business career and the conditions as they are found today, incidentally showing what the improvements in machinery from the picker to the loom have done in developing the cotton manufacturing industry.

During the dinner the guests were entertained by the solo work of Mr. John T. Balmer of Fall River. This was greatly appreciated by the members and he was warmly invited to respond to encores, which met with the full indorsement of all present.

After the dinner an hour or more was spent in exchange of greetings, and it was voted that

the meeting then about to adjourn would be considered one of the best ever held. A great deal of credit is due to the executive committee, and the success of this club is beyond question an assured fact.

The Correspondence School.

The man that would place a just estimate upon the value of the correspondence school must first rid himself of some popular notions. To begin with, he must lose sight of the idea that the correspondence school offers itself as a competitor of, or a substitute for, the college or the university; and he must guard against the prejudice that

THE INTERNATIONAL CORRESPONDENCE SCHOOLS AT SCRANTON, PA.

because the correspondence school is a commercial institution, it is necessarily inferior as an institution of learning. To the man unable to afford the expense of a college training, or whose home ties or other responsibilities make it impossible for him to attend a college, the correspondence school offers the only practical means for the securing of a technical education. The correspondence school is no more a competitor of the college than the benevolent society is a competitor of the church. And the mere fact that the correspondence school is a commercial institution makes effective instruction absolutely necessary to success.

The International Correspondence Schools, of Scranton, Pa., were founded in 1891 to teach the coal miners of Pennsylvania the theory of mining; prepare ambitious miners to pass examinations for promotion; and do something toward rendering less frequent the frightful disasters then common to mining operations. The immediate and astonishing success of the plan indicated its practicability. Three thousand enrolments were taken the first year. Many students passed the examinations required by the mining laws of the state of Pennsylvania and became foremen, inspectors, or managers. The success of the first beneficiaries of the new method of teaching naturally suggested the thought that the plan of training men for their work while at their work could be made to cover the entire field of industrial science. Other courses were prepared from time to time until the curriculum of the I. C. S. included courses in all the engineering trades and professions.

A perfect system is of course necessary. The person enrolling is sent at once two sets of instruction papers and a pamphlet telling him how to begin and proceed with his studies. After studying the first instruction paper till he has made himself familiar with the contents, the student writes out the answers to the examination questions and mails his work to the Schools for correction and criticism. He may then begin immediately to study the second paper. If the work he sends to the Schools proves worthy of a high percentage, it is "passed" and returned to him with a new instruction paper. If, on the other hand, his work shows him not thoroughly master of the paper he has studied, it is sent back to him with a letter of criticism and advice, and he is asked to do over again whatever work may be necessary to give him a thorough understanding of the lesson. All errors are carefully marked in red ink.

If a person enrolled fails to send in work within 60 days the instruction department writes to him and urges him to begin his studies; if he begins to study and afterward stops, he is urged at intervals to resume his work. Nothing is left undone to impress upon the student the great good to be gained by completing his course; to convince him that the habit of study is not harder to form than other good habits; and that the study habit once acquired carries with it the power of

concentration—the quality most necessary to a business success. Backward students receive the attention of a department composed of teachers that show a special fitness for the work, and a particular instructor is assigned to the exceptionally slow student, with instructions to insure the student's success even if it takes all the instructor's time. The students' aid department assists unemployed students, and students desiring a change of work, to secure employment, and furnishes to employers in need of them draftsmen, mechanics, and other trained men. No charge is And they do more. By the development of the made for this service.

The International Correspondence Schools teach to the working man the theory of his trade. mental power of the students the Schools cause to be diffused a mighty educational influence. They awaken to consciousness of larger possibilities thousands whose latent ability would—for them—remain undeveloped, and by so doing they contribute enormously to progress. The Schools spur the ambition of the young man in the mine, the mill, the shop and the office, and lead him by easy stages to a better position than he could otherwise attain. They help the employer by increasing the usefulness of the employee, and benefit the employee by winning for him the advancement and compensation sure to result from increased efficiency.

The Schools attract the attention of the young man, inspire him to strive for betterment, impel him to seek the companionship of books, and save from the tragic consequences of evil associations thousands that might otherwise drift with the current to ruin. The intelligence and self-control of the industrial classes—upon this more than upon philosophical distinctions or systems—depends the morality of a people. The International Correspondence Schools, then, are to say the least an important moral factor; for they are doing more than making skilled brain workers to direct and develop the industries. The representatives are working in every city, town and village, inducing men to give up idleness and devote their spare time to study. They take the shiftless off the street corner, out of the saloon, pool rooms and bowling alleys, and—by preventing the waste of money on drink and useless pleasures—put clothing on the backs and food in the mouths of wives and children.

Yardage to be Stamped.

Attention is called to a proposed amendment of the Folded Woven Goods Ordinance of Southern Nigeria by a bill about to be introduced into the Legislative Council. The bill permits certain variations in the manner of folding certain goods to meet the requirements of the trade, and consolidates the various amendments already made to the original ordinance. The following new section is quoted:

No folded goods other than those specified in the schedule thereto shall be imported into the colony or protectorate unless the same shall be folded in folds not less than 36 inches in length and each piece be marked with the number of yards and inches (if any) contained therein. Such mark shall be stamped on the fabric of each piece. Any words, figures, marks, or abbreviations of the words "yards' and "inches" which, according to the common use or custom of the trade are commonly taken to indicate the measure of the folded woven goods, may be used in such marking. No piece shall be made up to show more folds than the full number of yards it actually contains, any portion of a yard (over such number of yards) not to be shown as a fold. The above section is to apply to all folded woven goods imported into the colony or protectorate, whether for sale, use, or disposal therein, or for transhipment to or in transit for any other country, port or place, but the Comptroller of Customs may, with the approval of the Governor, exempt goods in transit for any other country in which the manner of folding or marking such goods is regulated by law.

The schedule of exemptions referred to is the same as that given in the "Board of Trade Journal" on December 1, 1910.—Manchester Guardian.

Calendar.

The Wonalancet Co., Nashua, N. H., manufacturers of carded cotton for woolen mills, are sending out a monthly calendar, of which we have just received the March issue. On this calendar is a picture of an old-time cotton field showing the negroes picking the cotton and the overseer weighing it.

The suit of the Draper Company against the Stafford Company, in which injunction and accounting are sought under patent to G. O. Draper, No. 527,014, was fully argued in the Circuit Court of the United States in Boston before Judge Aldrich on Tuesday, March 21, by W. K. Richardson, for the complainant, and W. H. Thurston, for defendant, and the case was taken under advisement by the court.

A New Textile Machinery Agency.

The William V. Threlfall Company is a new textile machinery agency which has taken offices in the Marshall Building, corner Broad, Central and Doane streets, Boston. Mr. Threlfall is widely known to textile manufacturers through his connection as salesmen with prominent cotton machinery builders. He has made arrangements with textile machine builders and supply houses to give him the representation for complete cotton, woolen and worsted mill equipment, or for almost any special line of machinery desired, and not only for manufacturers, but for bleachers, dyers and finishers of textile fabrics and factory equipment. He also represents numerous specialties used in mills as well as mill supplies.

Emil Maertens, an inventor of many machines for washing and de-greasing wool, died in Providence, R. I., Feb. 26, from a complication of diseases. He was 59 years of age and when 22 years old he came to this country from Brussels. He was employed at Philadelphia, Pa., Seymour, Conn., and later went to Fulton, N. Y.

Recent Textile Patents.

BOBBINS. Machine for Automatic Insertion and Threading of. 987,472. Jakob Luber, Herrbrugg, St. Gallen, Switzerland.

CARD Punching Machine. Jacquard. 987,259. Morris Schoenfeld, Switzerland.

COMBING Machine. Circle. 986,616. John H. Whitehead and George Galloway, Leeds, England.

DRYING Wool and Other Textile Materials. Machine for. 986,253. John F. White, Bradford, England.

DYE. Vat. 985,767. Wilhelm Bauer, Vohwinkel, Germany.

DYEING Apparatus. Skein. 985,936. Juan and Luis Regordosa, Barcelona, Spain.

DYEING Machines. Revolving Collapsible Beam for. 987,481. Frank M. Morton, Phoenix, Ala.

FABRIC. Method and Apparatus for Handling Coated Reinforcing. 13,213. Andrew Thoma, Cambridge, Mass.

FABRIC. Apparatus for Treating Adhesive-coated. 986,032. Andrew Thoma, Cambridge, Mass.

FABRIC Treating Apparatus. Textile. 985,695. Isaac E. Palmer, Middletown, Conn.

FIBER-CLEANING Machine. 984,689. Michael G. McLane, San Francisco, Cal.

FIBROUS Materials. Machine for Treating. 986,624. Chester T. Drake, Chicago, Ill.

KNITTED Fabric. 985,846. Robert W. Scott, Leeds Point, N. J.

KNITTING Machine. 985,927. Exilias Paquette, Lowell, Mass.

KNITTING Machine. Circular. 985,928. Exilias Paquette, Lowell, Mass.

LOOM. 986,073. William J. Lutton, Paterson, N. J.

LOOM Picker Stick Buffer. 984,663. Michael J. Harrigan, Providence, R. I.

LOOM, Weaving. 987,086. Georges E. Levy, Paris, France.

LOOM Compensating Head Gear. 986,634. Simeon S. Jackson, Readville, Mass.

LOOM Protector Mechanism. 987,110. Augustin J. Chevrette, Worcester, Mass.

LOOM Shuttle. 984,971. Johann Ruegg, Zurich, Switzerland.

LOOM Shuttle Check. 985,585. James J. Grogan and Oliver E. Johnson, South Bend, Ind.

LOOM Stop Motion. 986,215. William Pollock and E. S. Ling, Newmilns, Scotland.

LOOM Shuttle. 987,524. William H. Wilson, New Bedford, Mass.

LOOMS. Evener-frame for Tuft Fabric. 986,441. John A. Clark, Worcester, Mass.

LOOMS. Spring Shuttle Beater for Power. 987,623. Otto Hallensleben, Gorlitz, Germany.

SHUTTLE. Hand Threading. 985,143. George M. Cheney, Southbridge, Mass.

SHUTTLE-threading Implement. Portable Pneumatic. 984,606. Angelo Recci, Natick, R. I.

SHUTTLE Blocks. Manufacturing. 987,392. Moorhouse Mitchell, Ontario, Canada.

SPINNING Machine. 987,317. Durell O. Pease, Hampden, Mass.

SPINNING. Twisting and the Like Machines. Spindle Support for. 986,814. George W. Farnham, Lowell, Mass.

SPINDLE. 987,546. Henry L. Brown, Paterson, N. J.

SPINNING, Doubling and Twisting Machine. 986,699. Sebastin de Ferranti, Grindleford, England.

SHUTTLE. Weaver's. 986,040. Fritz Blumer-Streiff, Engi, Switzerland.

SPEED Changing Mechanism. 987,430. William C. Conant, Oak Park, Ill.

THREAD Cutting Mechanism. 986,724. Henry P. Kraft, New York.

THREADING Cutting Die. 984,745. Gary G. Brown, Roseburg, Oregon.

THREADS or Films, as Also Artificial Horsehair. Preparing Artificial. 986,017. Friedrich Lehner, Zurich, Switzerland.

TEXTILE Materials. Treating. 986,332. Robert Weiss, Kingersheim, Germany.

Recent Textile Trademarks Registered.

"Shepherd." Knitted undershirts, drawers, etc. Cooper & Roe, Nottingham, England.

"W. B." Handkerchiefs. Wilson Bros., Chicago, Ill.

"Our Pride." Cotton piece goods. Rice-Stix Dry Goods Co., St. Louis, Mo.

"Bronco." Ready-to-wear clothing. Siegel Bros. & Goodman, New York.

"Queen Louise." Manufactured linens and fabrics. Alexander & Perlmann, New York.

"Unitex." Silk half hose. The Jos. S. Mack Silk Co., Allentown, Pa.

"Shahristan." Rugs. Costikyan & Co., New York.

"Feurtex." Cloaks, dresses, etc. Henry Goldwater, New York.

"Black Bird." Work shirts. Carson, Pirie, Scott & Co., Chicago, Ill.

"Repello." Rain-coats. Goldman, Beckman & Co., Cincinnati, O.

"Maisilk." Silk piece goods. The Chas. A. Maish Co., Cincinnati, O.

"Maisateen." Cotton piece goods. The Chas. A. Maish Co., Cincinnati, O.

"San Tex." Cotton linen, wool piece goods. Sanger Bros., New York.

"Fairyland." Cotton piece goods. Rice-Stix Dry Goods Co., St. Louis, Mo.

"Baby Bunting." Vests, drawers, etc. Marshall Knitting Co., Utica, N. Y.

"The King." Hosiery. Blodgett, Ordway & Webber, Boston, Mass.

"Alma." Knit underwear. Springfield Knitting Co., Springfield, Mass.

"His Majesty." Hosiery. Wallace G. Starry, Harrisburg, Pa.

"Utopian." Sweaters, sweater caps, etc. Samuel Rottenberg, New York.

"G." Hosiery, knit underwear, etc. Myer P. Gold, Troy, N. Y.

"Siwosi." Hosiery. David F. Greenawalt, Philadelphia, Pa.

"Tarantulle." Voiles. Thomas A. Harris, New York.

Vou
Nam

Tabl